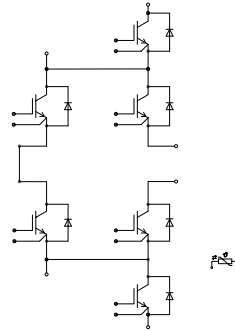
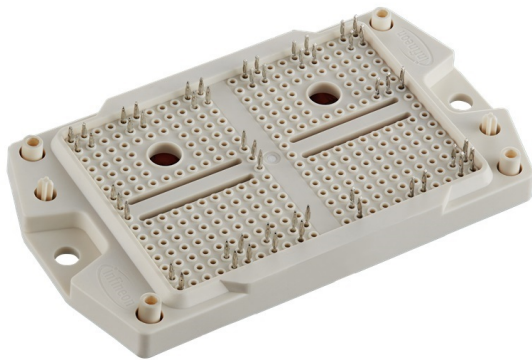


EasyPACK™ 模块 采用第七代沟槽栅/场终止IGBT7和碳化硅二极管 带有pressfit压接管脚和温度检测NTC
EasyPACK™ module with TRENCHSTOP™ IGBT7 and CoolSiC™ Schottky diode and PressFIT / NTC



$V_{CES} = 950V$

$I_{C\ nom} = 400A / I_{CRM} = 800A$

潜在应用

- 三电平应用
- 太阳能应用

电气特性

- CoolSiC™ 碳化硅肖特基二极管第5代
- 低开关损耗
- 低电感设计
- 沟槽栅IGBT7

机械特性

- PressFIT 压接技术
- 封装的 CTI > 400
- 集成NTC温度传感器

Potential Applications

- 3-level-applications
- Solar applications

Electrical Features

- CoolSiC™ Schottky diode gen 5
- Low switching losses
- Low inductive design
- Trenchstop™ IGBT7

Mechanical Features

- PressFIT contact technology
- Package with CTI > 400
- Integrated NTC temperature sensor

Module Label Code

Barcode Code 128



000001234560000000000000

DMX - Code



Content of the Code

Content of the Code	Digit
Module Serial Number	1 - 5
Module Material Number	6 - 11
Production Order Number	12 - 19
Datecode (Production Year)	20 - 21
Datecode (Production Week)	22 - 23

IGBT, T1 / T4 / IGBT, T1 / T4

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	950	V
集电极电流 Implemented collector current		I_{CN}	400	A
连续集电极直流电流 Continuous DC collector current	$T_H = 65^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	I_{CDC}	220	A
集电极重复峰值电流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	800	A
栅极 - 发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-20	V

特征值 / Characteristic Values

			min.	typ.	max.	
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	$I_C = 150\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,40 1,48 1,50	1,60	V V V
栅极阈值电压 Gate threshold voltage	$I_C = 6,50\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		$V_{G\text{Eth}}$	4,35	5,10	5,85 V
栅极电荷 Gate charge	$V_{GE} = -15 / 15\text{ V}, V_{CE} = 600\text{ V}$		Q_G	0,90		μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		$R_{G\text{int}}$	0,75		Ω
输入电容 Input capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	25,2		nF
反向传输电容 Reverse transfer capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,078		nF
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE} = 950\text{ V}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	I_{CES}		0,071	mA
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{GES}		100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ on}}$	0,094 0,094 0,094		μs μs μs
上升时间(电感负载) Rise time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,033 0,033 0,033		μs μs μs
关断延迟时间(电感负载) Turn-off delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ off}}$	0,74 0,81 0,82		μs μs μs
下降时间(电感负载) Fall time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,033 0,057 0,07		μs μs μs
开通损耗能量(每脉冲) Turn-on energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}, L\sigma = 35\text{ nH}$ $di/dt = 4200\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	4,30 4,30 4,30		mJ mJ mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}, L\sigma = 35\text{ nH}$ $du/dt = 4600\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 20\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	5,00 6,60 7,30		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 600\text{ V}$ $V_{CE\text{ max}} = V_{CES} - L_{sCE} \cdot di/dt$ $t_P \leq 0\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		I_{SC}	1200		A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个 IGBT / per IGBT		R_{thJH}	0,240		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

IGBT, T2 / T3 / IGBT, T2 / T3

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	950	V
集电极电流 Implemented collector current		I_{CN}	400	A
连续集电极直流电流 Continuous DC collector current	$T_H = 65^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	I_{CDC}	295	A
集电极重复峰值电流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	800	A
栅极 - 发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-20	V

特征值 / Characteristic Values

			min.	typ.	max.	
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	$I_C = 150\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,07 1,04 1,02	1,15	V V V
栅极阈值电压 Gate threshold voltage	$I_C = 6,50\text{ mA}, V_{CE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$		$V_{G\text{Eth}}$	4,15	4,90	5,65 V
栅极电荷 Gate charge	$V_{GE} = -15 / 15\text{ V}, V_{CE} = 600\text{ V}$		Q_G	4,10		μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		$R_{G\text{int}}$	0,75		Ω
输入电容 Input capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	49,2		nF
反向传输电容 Reverse transfer capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,228		nF
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE} = 950\text{ V}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	I_{CES}		0,071	mA
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{GES}		100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ on}}$	0,21 0,19 0,18		μs μs μs
上升时间(电感负载) Rise time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,034 0,038 0,039		μs μs μs
关断延迟时间(电感负载) Turn-off delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ off}}$	0,85 0,96 0,98		μs μs μs
下降时间(电感负载) Fall time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,24 0,45 0,50		μs μs μs
开通损耗能量(每脉冲) Turn-on energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}, L\sigma = 35\text{ nH}$ $di/dt = 4500\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	3,35 3,46 3,49		mJ mJ mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}, L\sigma = 35\text{ nH}$ $du/dt = 1350\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	24,8 35,6 37,9		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 600\text{ V}$ $V_{CE\text{ max}} = V_{CES} - L_{sCE} \cdot di/dt$ $t_P \leq 0\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		I_{SC}	1200		A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个 IGBT / per IGBT		R_{thJH}	0,280		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

IGBT, T5 / T6 / IGBT, T5 / T6

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{CES}	950	V
集电极电流 Implemented collector current		I_{CN}	200	A
连续集电极直流电流 Continuous DC collector current	$T_H = 65^{\circ}\text{C}, T_{vj\max} = 175^{\circ}\text{C}$	I_{CDC}	115	A
集电极重复峰值电流 Repetitive peak collector current	$t_P = 1\text{ ms}$	I_{CRM}	400	A
栅极 - 发射极峰值电压 Gate-emitter peak voltage		V_{GES}	+/-20	V

特征值 / Characteristic Values

			min.	typ.	max.	
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	$I_C = 150\text{ A}$ $V_{GE} = 15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$V_{CE\text{ sat}}$	1,68 1,88 1,92	2,00	V V V
栅极阈值电压 Gate threshold voltage	$I_C = 3,25\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^{\circ}\text{C}$		$V_{G\text{Eth}}$	4,35	5,10	5,85 V
栅极电荷 Gate charge	$V_{GE} = -15 / 15\text{ V}, V_{CE} = 600\text{ V}$		Q_G	0,45		μC
内部栅极电阻 Internal gate resistor	$T_{vj} = 25^{\circ}\text{C}$		$R_{G\text{int}}$	1,5		Ω
输入电容 Input capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{ies}	12,6		nF
反向传输电容 Reverse transfer capacitance	$f = 100\text{ kHz}, T_{vj} = 25^{\circ}\text{C}, V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		C_{res}	0,039		nF
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE} = 950\text{ V}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$	I_{CES}		0,1	mA
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE} = 0\text{ V}, V_{GE} = 20\text{ V}, T_{vj} = 25^{\circ}\text{C}$		I_{GES}		100	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ on}}$	0,086 0,093 0,094		μs μs μs
上升时间(电感负载) Rise time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_r	0,027 0,03 0,03		μs μs μs
关断延迟时间(电感负载) Turn-off delay time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 30\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	$t_{d\text{ off}}$	0,57 0,615 0,625		μs μs μs
下降时间(电感负载) Fall time, inductive load	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}$ $V_{GE} = -15 / 15\text{ V}$ $R_{Goff} = 30\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	t_f	0,024 0,052 0,073		μs μs μs
开通损耗能量(每脉冲) Turn-on energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}, L\sigma = 35\text{ nH}$ $di/dt = 4000\text{ A}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Gon} = 5,0\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{on}	6,35 7,60 8,00		mJ mJ mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	$I_C = 150\text{ A}, V_{CE} = 500\text{ V}, L\sigma = 35\text{ nH}$ $du/dt = 5800\text{ V}/\mu\text{s} (T_{vj} = 150^{\circ}\text{C})$ $V_{GE} = -15 / 15\text{ V}, R_{Goff} = 30\ \Omega$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{off}	5,00 6,30 6,80		mJ mJ mJ
短路数据 SC data	$V_{GE} \leq 15\text{ V}, V_{CC} = 600\text{ V}$ $V_{CE\text{ max}} = V_{CES} - L_{sCE} \cdot di/dt$ $t_P \leq 0\ \mu\text{s}, T_{vj} = 150^{\circ}\text{C}$		I_{SC}	600		A
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个 IGBT / per IGBT		R_{thJH}	0,451		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

二极管, D1 / D4 / Diode, D1 / D4

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	950	V
正向电流 Implemented forward current		I_{FN}	200	A
连续正向直流电流 Continuous DC forward current		I_F	150	A
正向重复峰值电流 Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	400	A
I_{2t} -值 I_{2t} - value	$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I_{2t}	1620 1530	A^2s A^2s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$I_F = 150\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 150\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 150\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	V_F	2,33 2,12 2,08	2,54	V V V
反向恢复峰值电流 Peak reverse recovery current	$I_F = 150\text{ A}, -di_F/dt = 4000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	I_{RM}	90,0 130 140		A A A
恢复电荷 Recovered charge	$I_F = 150\text{ A}, -di_F/dt = 4000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	Q_r	5,50 10,0 12,5		μC μC μC
反向恢复损耗 (每脉冲) Reverse recovery energy	$I_F = 150\text{ A}, -di_F/dt = 4000\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{rec}	1,50 3,30 3,95		mJ mJ mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个二极管 / per diode		R_{thJH}	0,570		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

二极管, D2 / D3 / Diode, D2 / D3

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	950	V
正向电流 Implemented forward current		I_{FN}	200	A
连续正向直流电流 Continuous DC forward current		I_F	150	A
正向重复峰值电流 Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	400	A
I_{2t} -值 I_{2t} - value	$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I_{2t}	1620 1530	A^2s A^2s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$I_F = 150\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 150\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 150\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	V_F	2,33 2,12 2,06	2,54	V V V
反向恢复峰值电流 Peak reverse recovery current	$I_F = 150\text{ A}, -di_F/dt = 4500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	I_{RM}	133 180 195		A A A
恢复电荷 Recovered charge	$I_F = 150\text{ A}, -di_F/dt = 4500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	Q_r	6,00 13,0 15,5		μC μC μC
反向恢复损耗 (每脉冲) Reverse recovery energy	$I_F = 150\text{ A}, -di_F/dt = 4500\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{rec}	2,40 5,70 6,80		mJ mJ mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个二极管 / per diode		R_{thJH}	0,570		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

二极管, D5-D6 / Diode, D5-D6

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	$T_{vj} = 25^{\circ}\text{C}$	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current		I_F	100	A
正向重复峰值电流 Repetitive peak forward current	$t_P = 1\text{ ms}$	I_{FRM}	200	A
I_{2t} -值 I_{2t} - value	$V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 125^{\circ}\text{C}$ $V_R = 0\text{ V}, t_P = 10\text{ ms}, T_{vj} = 150^{\circ}\text{C}$	I_{2t}	1650 1550	A^2s A^2s

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	$I_F = 100\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 100\text{ A}, V_{GE} = 0\text{ V}$ $I_F = 100\text{ A}, V_{GE} = 0\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	V_F	1,45 1,75 1,85	1,75	V V V
反向恢复峰值电流 Peak reverse recovery current	$I_F = 100\text{ A}, -di_F/dt = 3200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	I_{RM}	60,0 60,0 60,0		A A A
恢复电荷 Recovered charge	$I_F = 100\text{ A}, -di_F/dt = 3200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	Q_r	1,85 1,85 1,85		μC μC μC
反向恢复损耗 (每脉冲) Reverse recovery energy	$I_F = 100\text{ A}, -di_F/dt = 3200\text{ A}/\mu\text{s} (T_{vj}=150^{\circ}\text{C})$ $V_R = 500\text{ V}$ $V_{GE} = -15\text{ V}$	$T_{vj} = 25^{\circ}\text{C}$ $T_{vj} = 125^{\circ}\text{C}$ $T_{vj} = 150^{\circ}\text{C}$	E_{rec}	0,68 0,68 0,68		mJ mJ mJ
结 - 散热器热阻 Thermal resistance, junction to heatsink	每个二极管 / per diode		R_{thJH}	0,474		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\text{ op}}$	-40	150	$^{\circ}\text{C}$

负温度系数热敏电阻 / NTC-Thermistor

特征值 / Characteristic Values

			min.	typ.	max.	
额定电阻值 Rated resistance	$T_{NTC} = 25^{\circ}\text{C}$	R_{25}		5,00		k Ω
R100 偏差 Deviation of R100	$T_{NTC} = 100^{\circ}\text{C}, R_{100} = 493\text{ }\Omega$	$\Delta R/R$	-5		5	%
耗散功率 Power dissipation	$T_{NTC} = 25^{\circ}\text{C}$	P_{25}			20,0	mW
B-值 B-value	$R_2 = R_{25} \exp [B_{25/50}(1/T_2 - 1/(298,15\text{ K}))]$	$B_{25/50}$		3375		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/80}(1/T_2 - 1/(298,15\text{ K}))]$	$B_{25/80}$		3411		K
B-值 B-value	$R_2 = R_{25} \exp [B_{25/100}(1/T_2 - 1/(298,15\text{ K}))]$	$B_{25/100}$		3433		K

根据应用手册标定

Specification according to the valid application note.

模块 / Module

绝缘测试电压 Isolation test voltage	RMS, f = 50 Hz, t = 1 min.	V _{ISOL}	3,2	kV
内部绝缘 Internal isolation	基本绝缘 (class 1, IEC 61140) basic insulation (class 1, IEC 61140)		Al ₂ O ₃	
爬电距离 Creepage distance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		11,5 6,8	mm
电气间隙 Clearance	端子至散热器 / terminal to heatsink 端子至端子 / terminal to terminal		9,4 5,5	mm
相对电痕指数 Comperative tracking index		CTI	> 400	
相对温度指数 (电) RTI Elec.	住房 housing	RTI	140	°C
min. typ. max.				
杂散电感, 模块 Stray inductance module		L _{sCE}		15 nH
储存温度 Storage temperature		T _{stg}	-40	125 °C
模块安装的安装扭矩 Mounting torque for modul mounting	螺丝 根据相应的应用手册进行安装 Screw - Mounting according to valid application note	M	1,30	1,50 Nm
重量 Weight		G	78	g

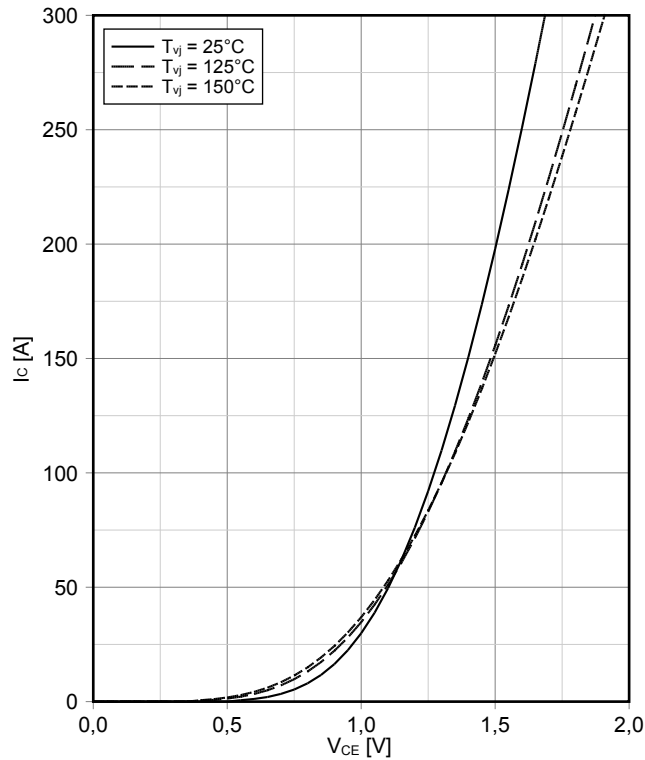
Der Strom im Dauerbetrieb ist auf 25 A effektiv pro Anschlusspin begrenzt.

The current under continuous operation is limited to 25 A rms per connector pin.

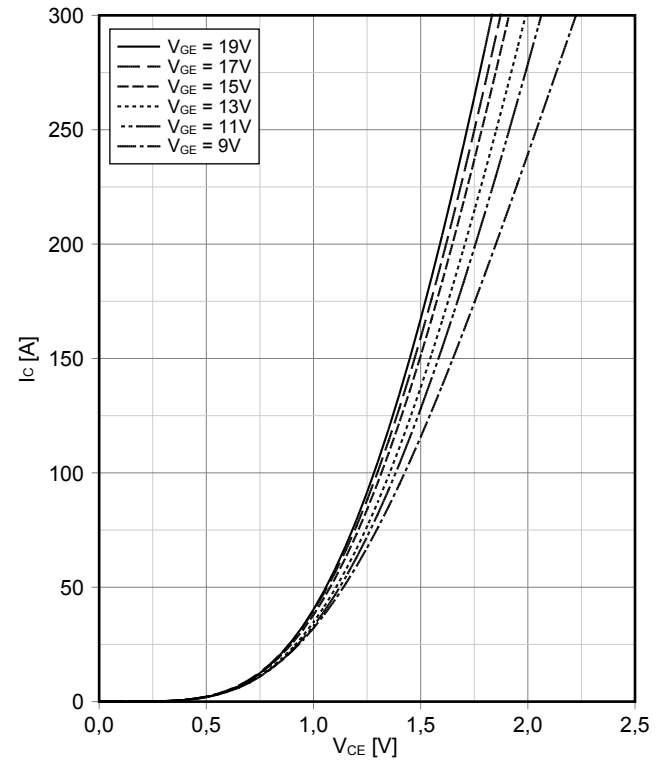
IGBT- und Dioden-RthJH-Parameter mit einer Wärmeleitpaste $\lambda_{\text{Paste}} = 3.3 \text{ W/(m}\cdot\text{K)}$ gemessen

IGBT- and diode- RthJH parameters measured with thermal grease of $\lambda_{\text{Paste}} = 3.3 \text{ W/(m}\cdot\text{K)}$

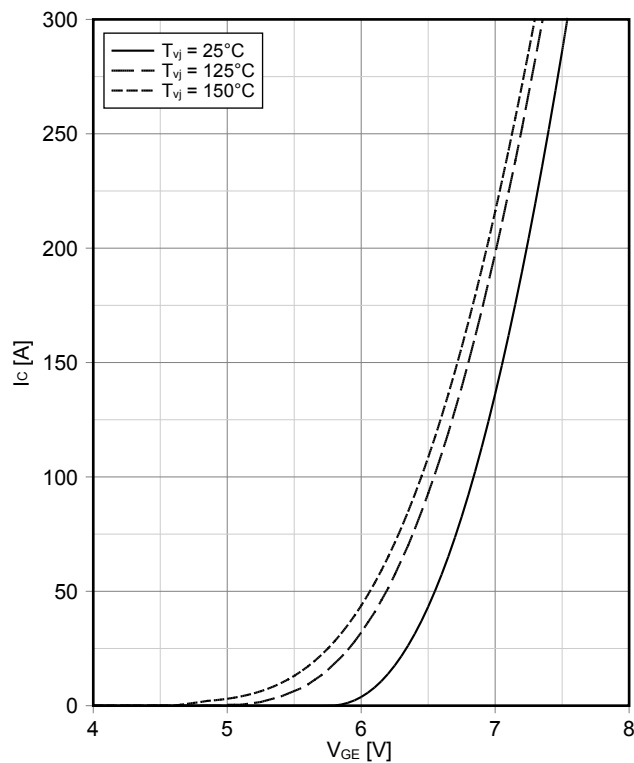
输出特性 IGBT, T1 / T4 (典型)
output characteristic IGBT, T1 / T4 (typical)
 $I_C = f(V_{CE})$
 $V_{GE} = 15\text{ V}$



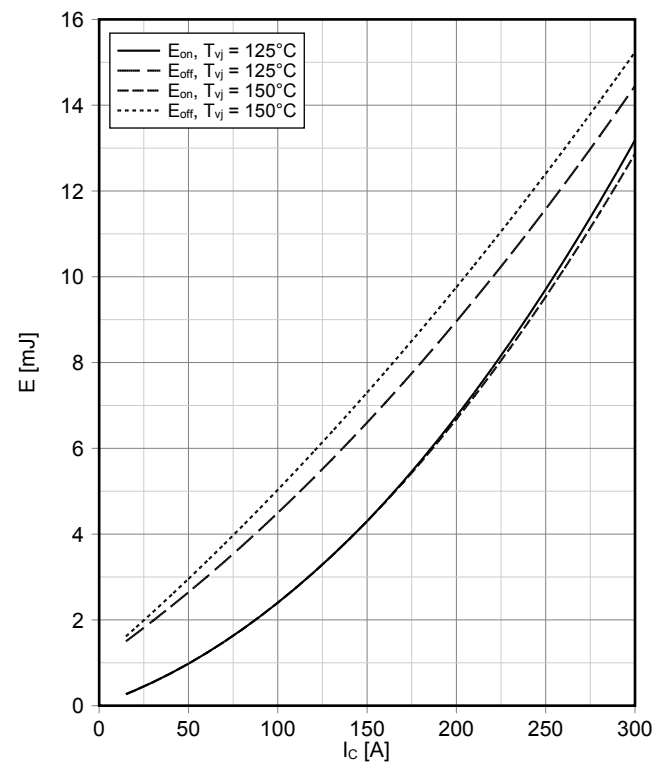
输出特性 IGBT, T1 / T4 (典型)
output characteristic IGBT, T1 / T4 (typical)
 $I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



传输特性 IGBT, T1 / T4 (典型)
transfer characteristic IGBT, T1 / T4 (typical)
 $I_C = f(V_{GE})$
 $V_{CE} = 20\text{ V}$



开关损耗 IGBT, T1 / T4 (典型)
switching losses IGBT, T1 / T4 (typical)
 $E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 5\ \Omega$, $R_{Goff} = 20\ \Omega$, $V_{CE} = 500\text{ V}$

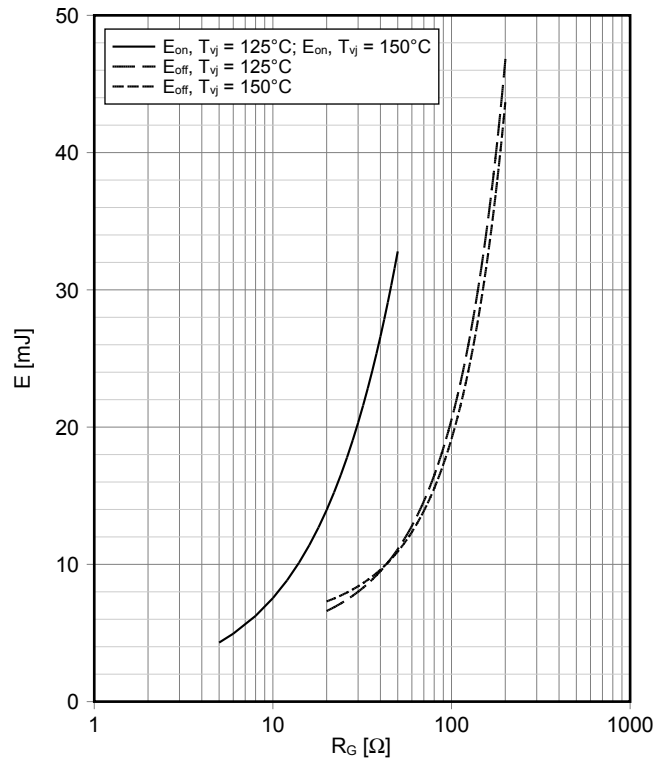


开关损耗 IGBT, T1 / T4 (典型)

switching losses IGBT, T1 / T4 (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

$V_{GE} = \pm 15 \text{ V}$, $I_C = 150 \text{ A}$, $V_{CE} = 500 \text{ V}$

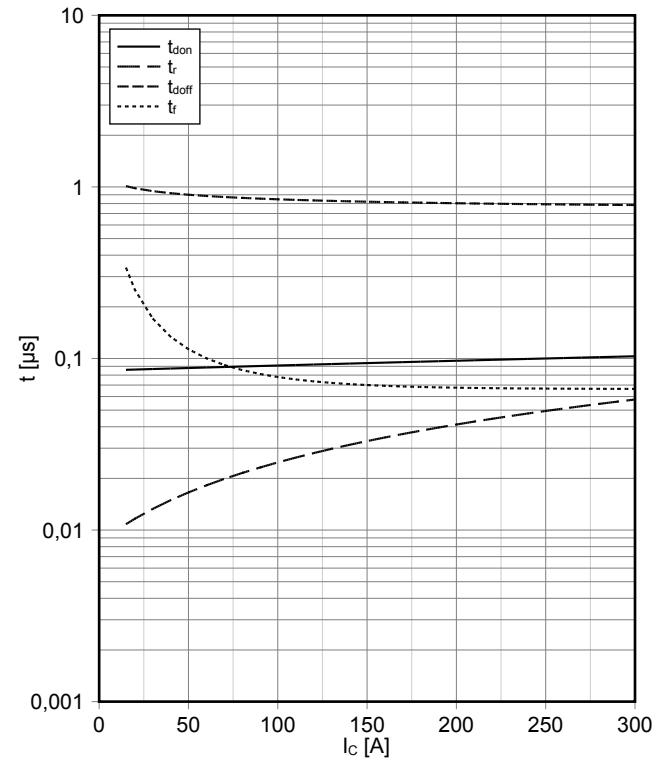


??? IGBT, T1 / T4 (典型)

switching times IGBT, T1 / T4 (typical)

$t_{don} = f(I_C)$, $t_r = f(I_C)$, $t_{doff} = f(I_C)$, $t_f = f(I_C)$

$V_{GE} = \pm 15 \text{ V}$, $R_{Gon} = 5 \Omega$, $R_{Goff} = 20 \Omega$, $V_{CE} = 500 \text{ V}$, $T_{vj} = 150^\circ\text{C}$

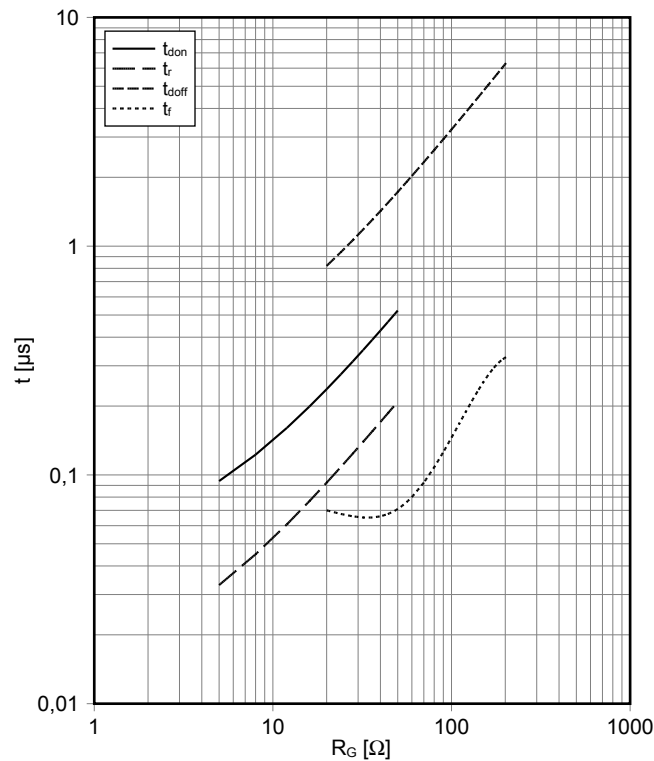


??? IGBT, T1 / T4 (典型)

switching times IGBT, T1 / T4 (typical)

$t_{don} = f(R_G)$, $t_r = f(R_G)$, $t_{doff} = f(R_G)$, $t_f = f(R_G)$

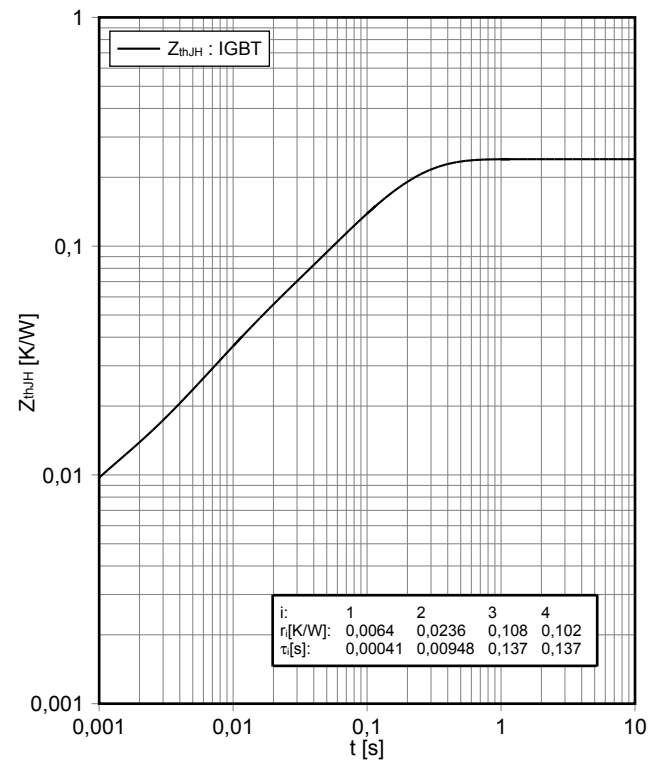
$V_{GE} = \pm 15 \text{ V}$, $I_C = 150 \text{ A}$, $V_{CE} = 500 \text{ V}$, $T_{vj} = 150^\circ\text{C}$



瞬态热阻抗 IGBT, T1 / T4

transient thermal impedance IGBT, T1 / T4

$Z_{thJH} = f(t)$

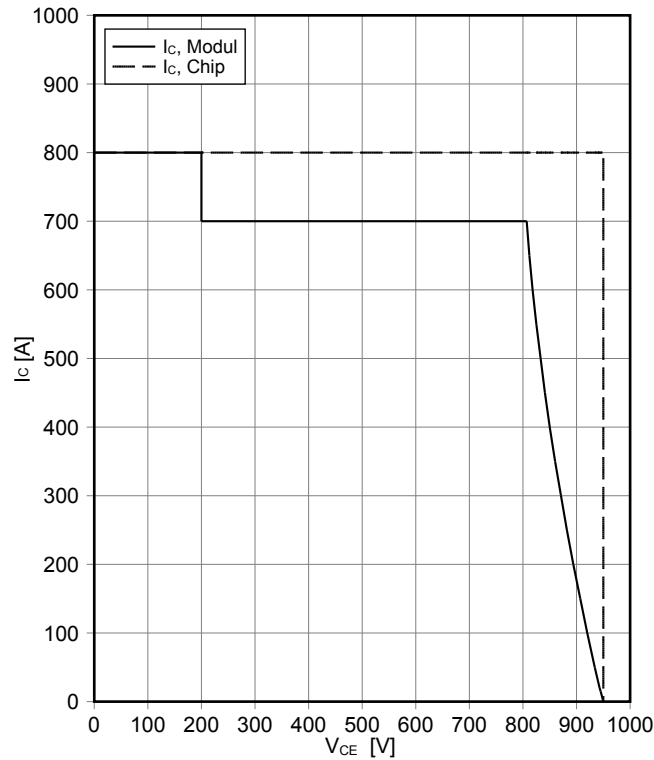


反偏安全工作区 IGBT, T1 / T4 (RBSOA)

reverse bias safe operating area IGBT, T1 / T4 (RBSOA)

$I_C = f(V_{CE})$

$V_{GE} = \pm 15 \text{ V}$, $R_{Goff} = 20 \Omega$, $T_{vj} = 150^\circ\text{C}$

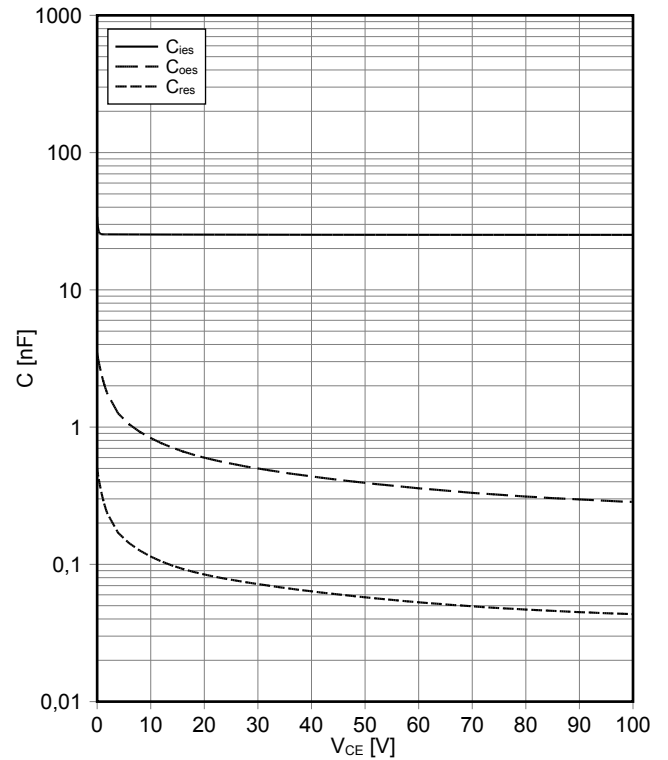


电容特性 IGBT, T1 / T4 (典型)

capacity characteristic IGBT, T1 / T4 (typical)

$C = f(V_{CE})$

$V_{GE} = 0 \text{ V}$, $T_{vj} = 25^\circ\text{C}$, $f = 100 \text{ kHz}$

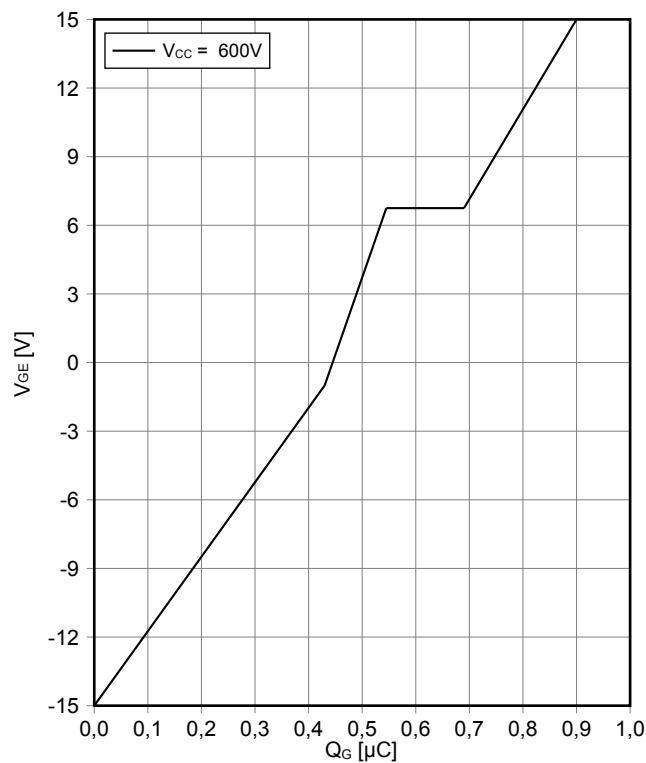


栅极电荷特性 IGBT, T1 / T4 (典型)

gate charge characteristic IGBT, T1 / T4 (typical)

$V_{GE} = f(Q_G)$

$I_C = 400 \text{ A}$, $T_{vj} = 25^\circ\text{C}$

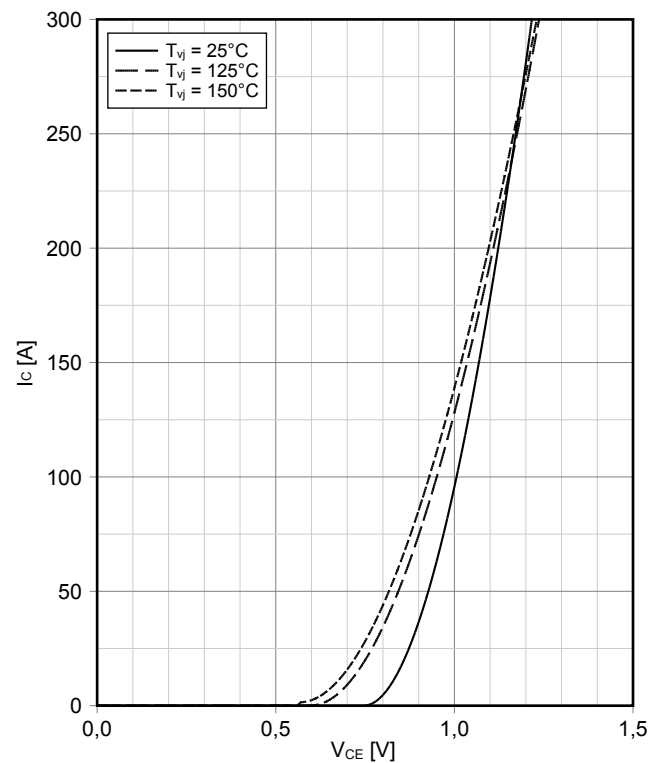


输出特性 IGBT, T2 / T3 (典型)

output characteristic IGBT, T2 / T3 (typical)

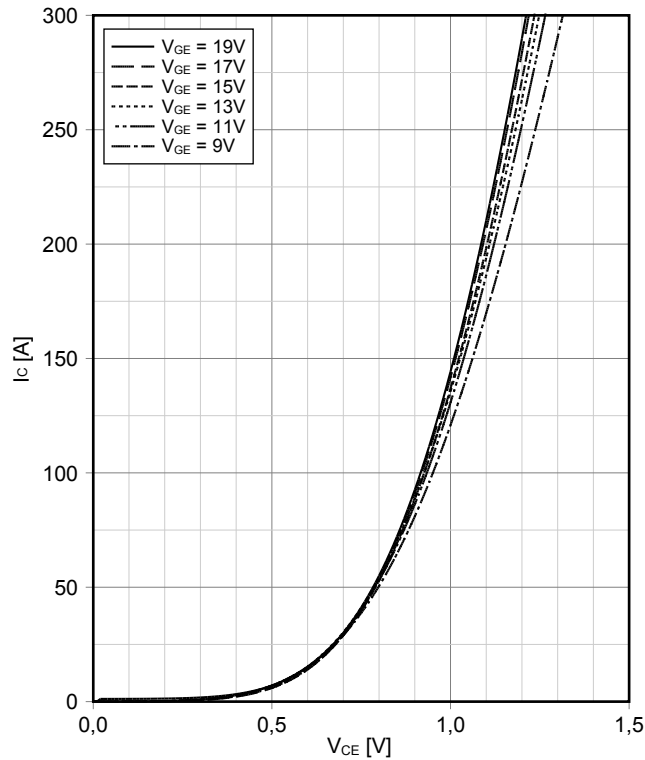
$I_C = f(V_{CE})$

$V_{GE} = 15 \text{ V}$



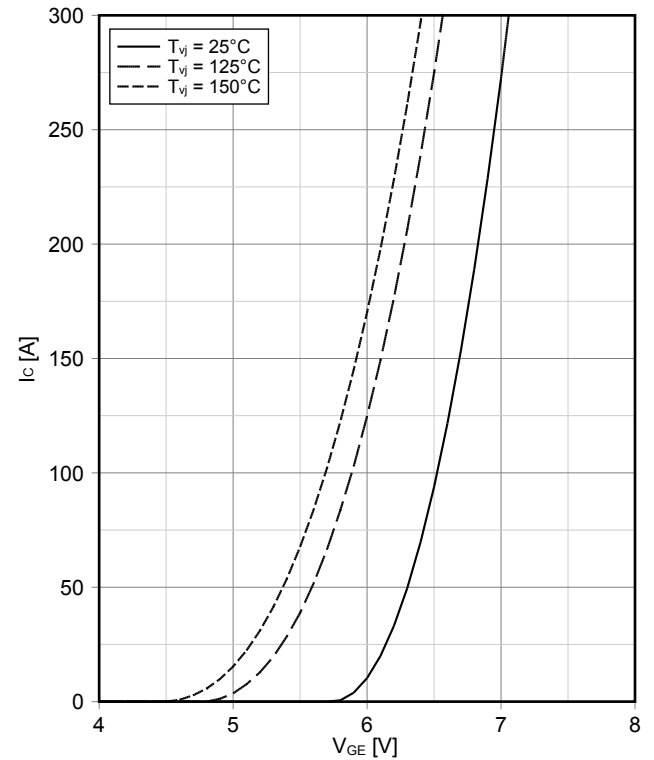
输出特性 IGBT, T2 / T3 (典型)
output characteristic IGBT, T2 / T3 (typical)

$I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



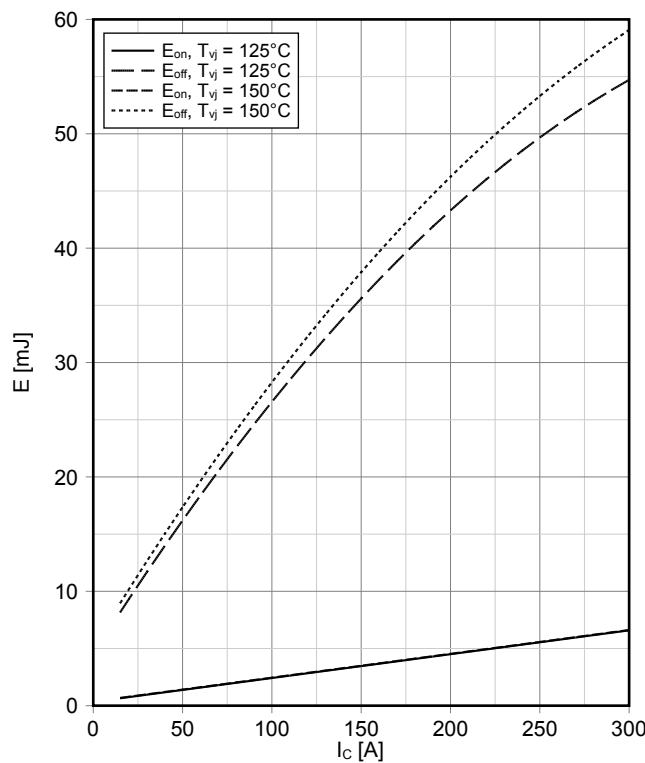
传输特性 IGBT, T2 / T3 (典型)
transfer characteristic IGBT, T2 / T3 (typical)

$I_C = f(V_{GE})$
 $V_{CE} = 20\text{ V}$



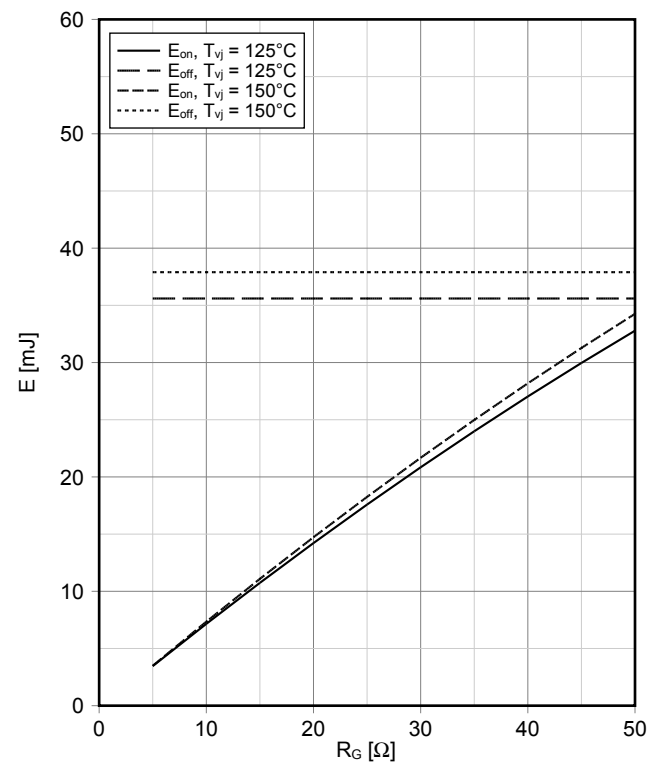
开关损耗 IGBT, T2 / T3 (典型)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 5\ \Omega$, $R_{Goff} = 5\ \Omega$, $V_{CE} = 500\text{ V}$



开关损耗 IGBT, T2 / T3 (典型)
switching losses IGBT, T2 / T3 (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}$, $I_C = 150\text{ A}$, $V_{CE} = 500\text{ V}$

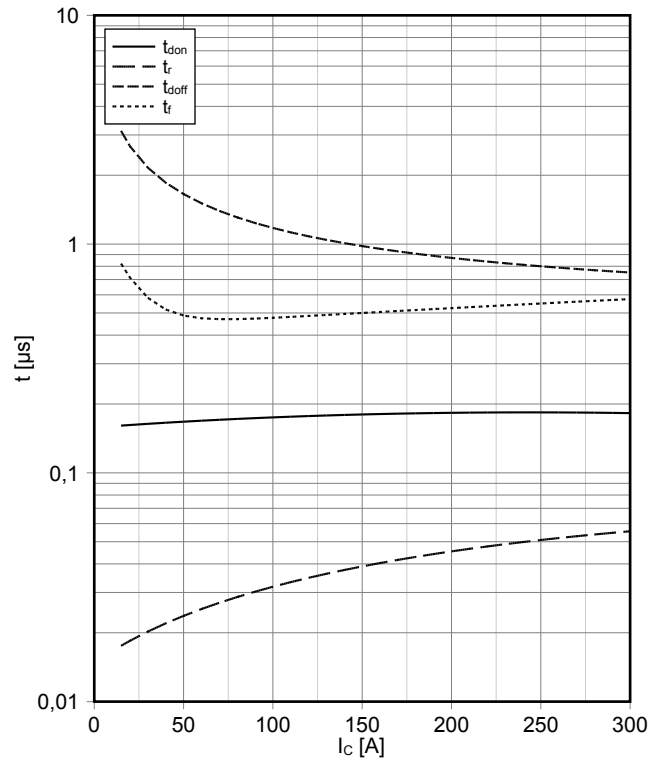


??? IGBT, T2 / T3 (典型)

switching times IGBT, T2 / T3 (typical)

$t_{don} = f(I_C)$, $t_r = f(I_C)$, $t_{doff} = f(I_C)$, $t_f = f(I_C)$

$V_{GE} = \pm 15 \text{ V}$, $R_{Gon} = 5 \Omega$, $R_{Goff} = 5 \Omega$, $V_{CE} = 500 \text{ V}$, $T_{vj} = 150^\circ\text{C}$

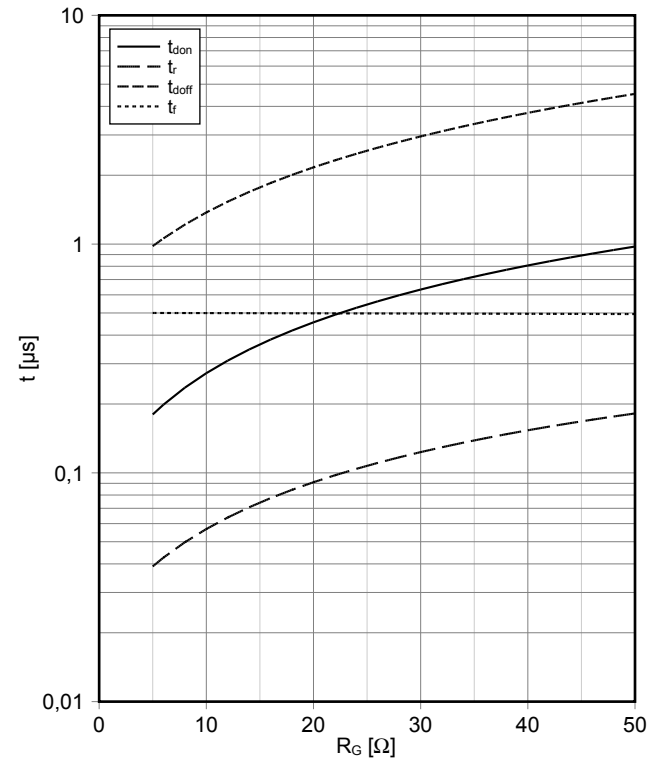


??? IGBT, T2 / T3 (典型)

switching times IGBT, T2 / T3 (typical)

$t_{don} = f(R_G)$, $t_r = f(R_G)$, $t_{doff} = f(R_G)$, $t_f = f(R_G)$

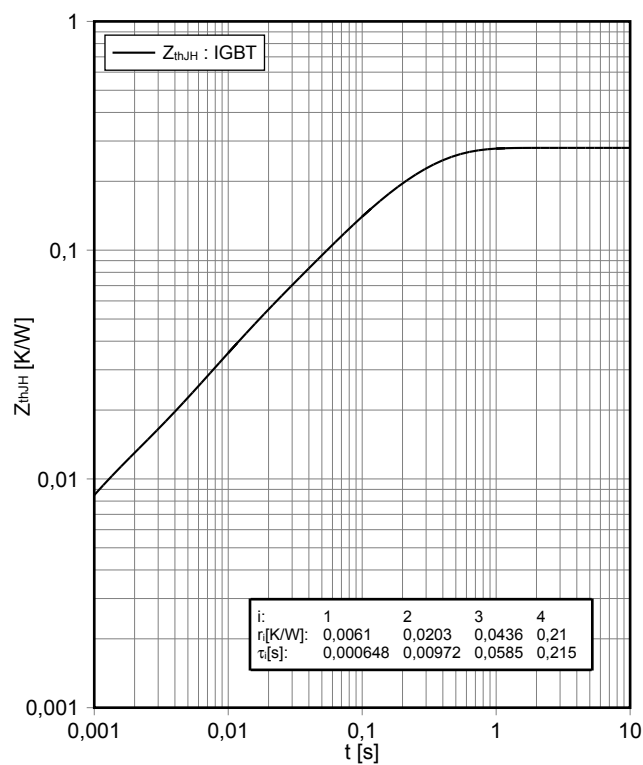
$V_{GE} = \pm 15 \text{ V}$, $I_C = 150 \text{ A}$, $V_{CE} = 500 \text{ V}$, $T_{vj} = 150^\circ\text{C}$



瞬态热阻抗 IGBT, T2 / T3

transient thermal impedance IGBT, T2 / T3

$Z_{thJH} = f(t)$

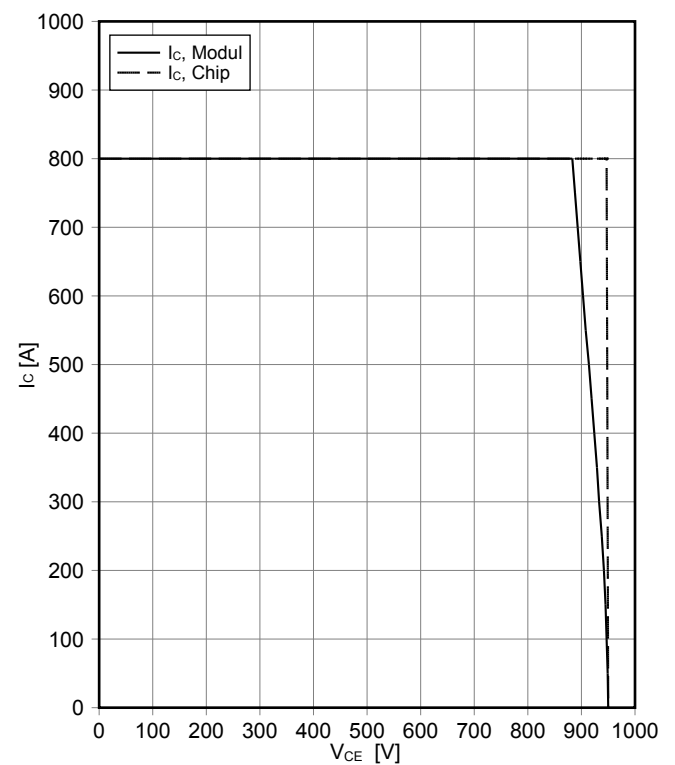


反偏安全工作区 IGBT, T2 / T3 (RBSOA)

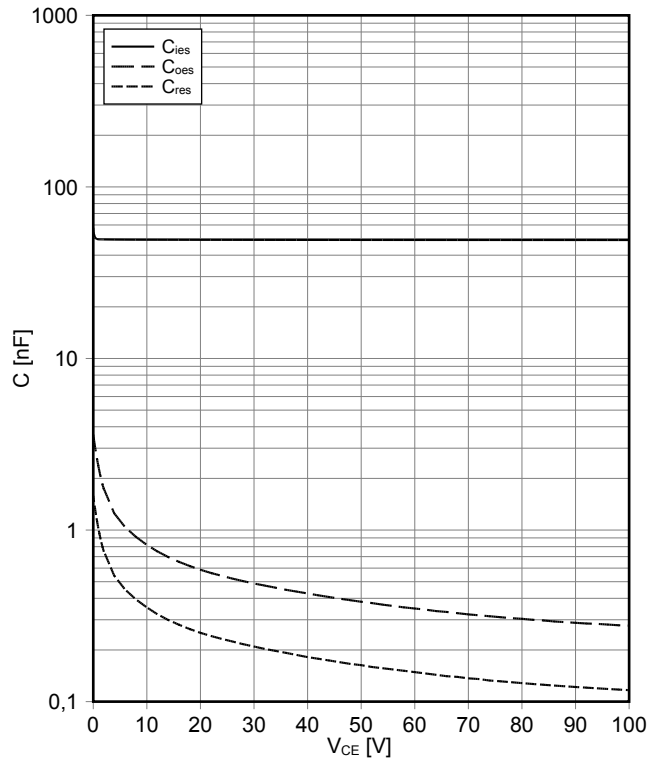
reverse bias safe operating area IGBT, T2 / T3 (RBSOA)

$I_C = f(V_{CE})$

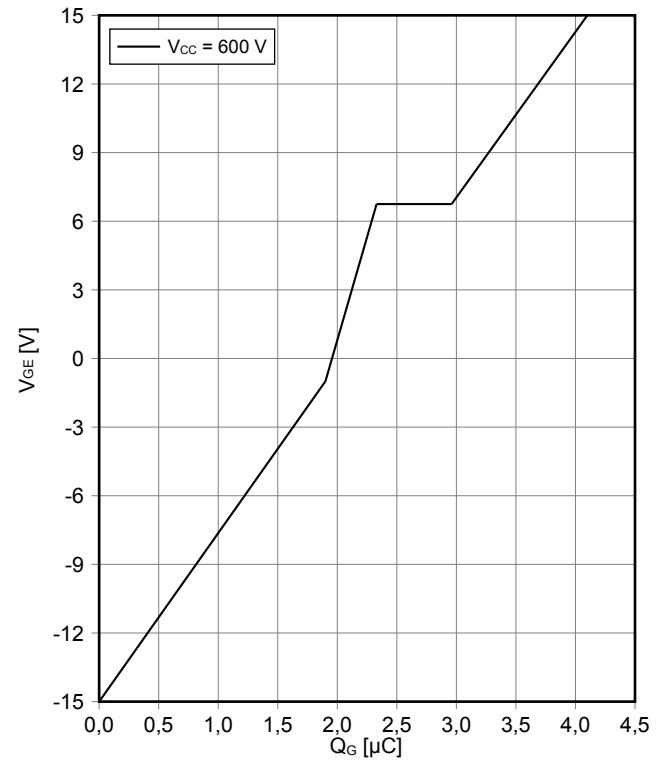
$V_{GE} = \pm 15 \text{ V}$, $R_{Goff} = 5 \Omega$, $T_{vj} = 150^\circ\text{C}$



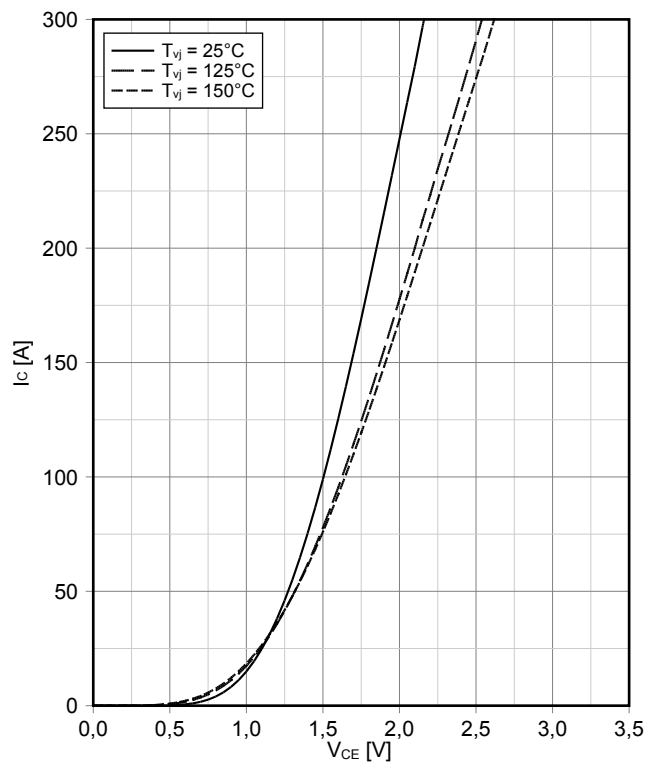
电容特性 IGBT, T2 / T3 (典型)
capacity characteristic IGBT, T2 / T3 (typical)
 $C = f(V_{CE})$
 $V_{GE} = 0 \text{ V}$, $T_{vj} = 25^\circ\text{C}$, $f = 100\text{kHz}$



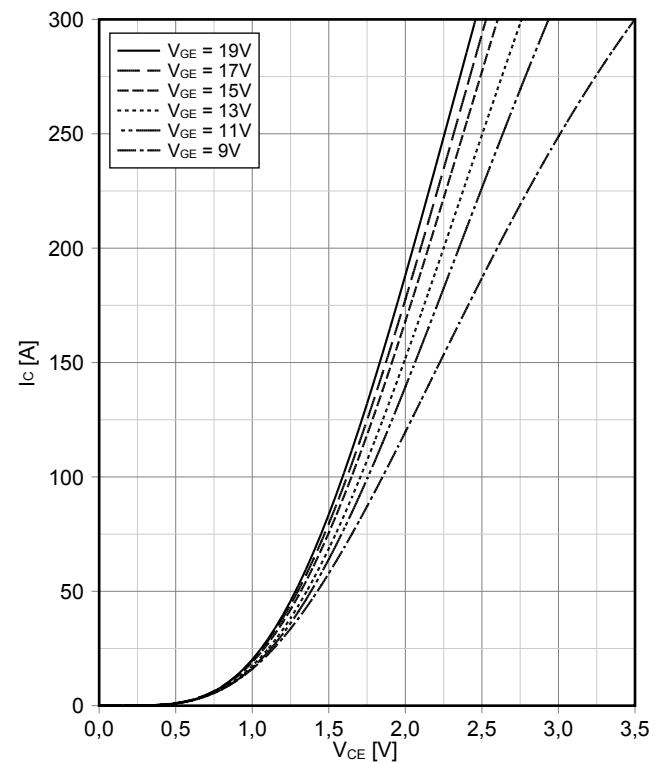
栅极电荷特性 IGBT, T2 / T3 (典型)
gate charge characteristic IGBT, T2 / T3 (typical)
 $V_{GE} = f(Q_G)$
 $I_C = 400 \text{ A}$, $T_{vj} = 25^\circ\text{C}$



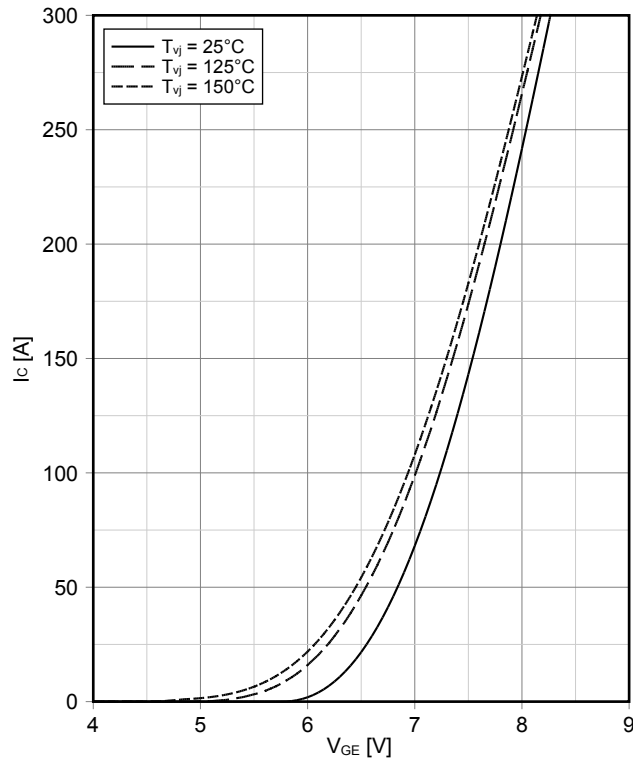
输出特性 IGBT, T5 / T6 (典型)
output characteristic IGBT, T5 / T6 (typical)
 $I_C = f(V_{CE})$
 $V_{GE} = 15 \text{ V}$



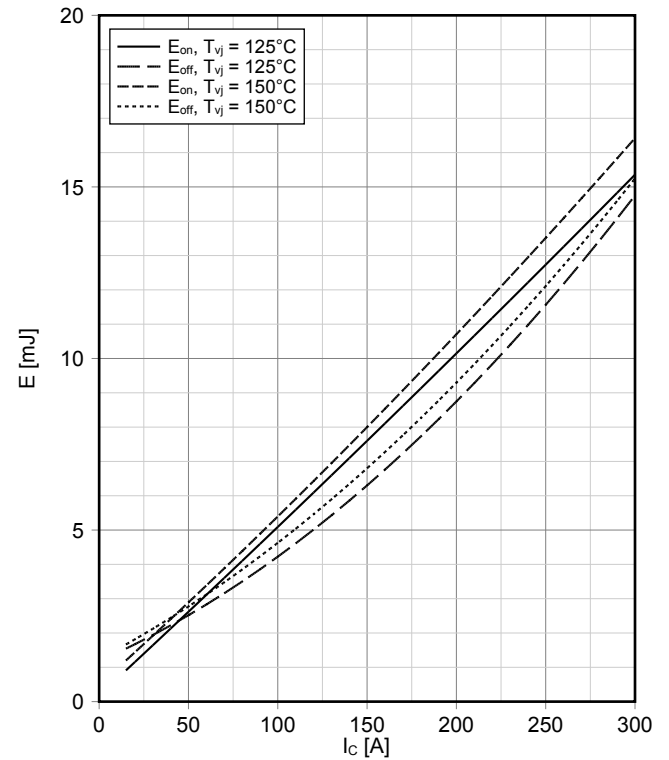
输出特性 IGBT, T5 / T6 (典型)
output characteristic IGBT, T5 / T6 (typical)
 $I_C = f(V_{CE})$
 $T_{vj} = 150^\circ\text{C}$



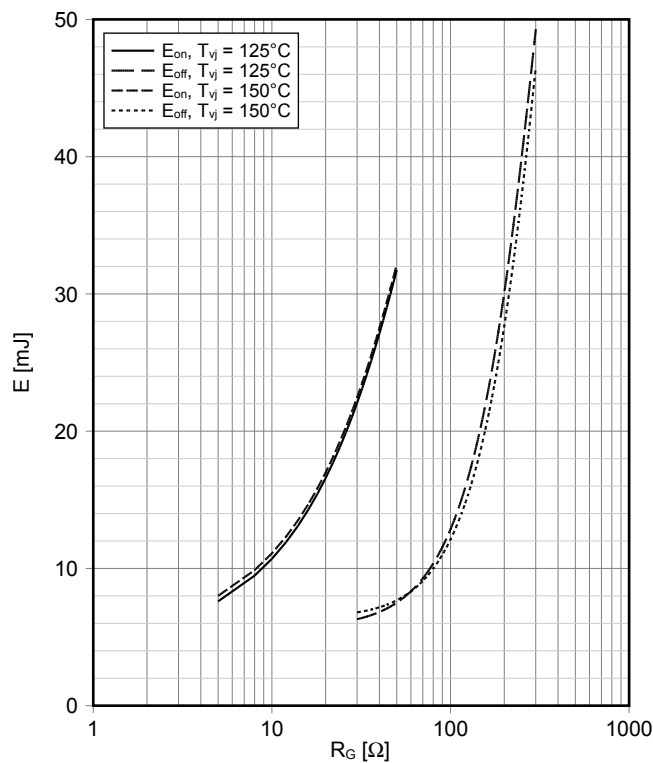
传输特性 IGBT, T5 / T6 (典型)
transfer characteristic IGBT, T5 / T6 (typical)
 $I_C = f(V_{GE})$
 $V_{CE} = 20\text{ V}$



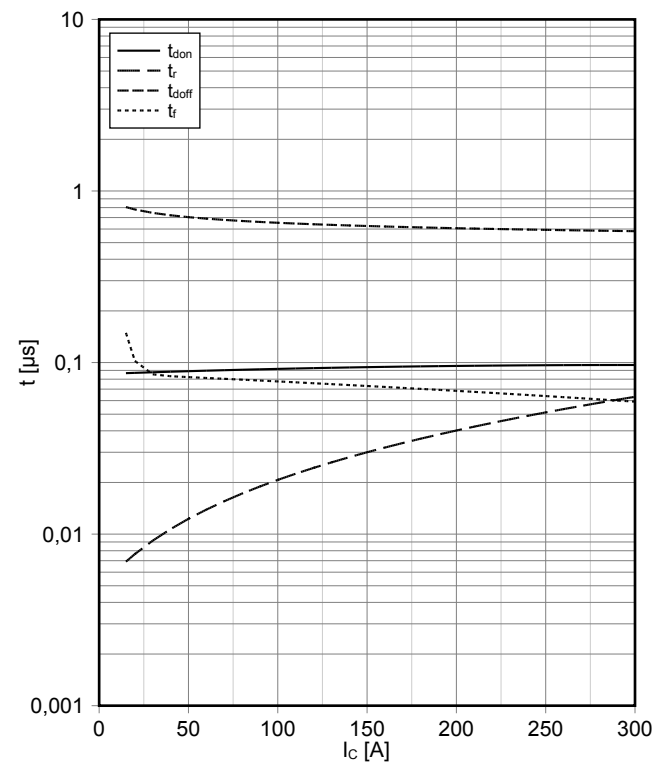
开关损耗 IGBT, T5 / T6 (典型)
switching losses IGBT, T5 / T6 (typical)
 $E_{on} = f(I_C)$, $E_{off} = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 5\ \Omega$, $R_{Goff} = 30\ \Omega$, $V_{CE} = 500\text{ V}$



开关损耗 IGBT, T5 / T6 (典型)
switching losses IGBT, T5 / T6 (typical)
 $E_{on} = f(R_G)$, $E_{off} = f(R_G)$
 $V_{GE} = \pm 15\text{ V}$, $I_C = 150\text{ A}$, $V_{CE} = 500\text{ V}$



??? IGBT, T5 / T6 (典型)
switching times IGBT, T5 / T6 (typical)
 $t_{don} = f(I_C)$, $t_r = f(I_C)$, $t_{doff} = f(I_C)$, $t_f = f(I_C)$
 $V_{GE} = \pm 15\text{ V}$, $R_{Gon} = 5\ \Omega$, $R_{Goff} = 30\ \Omega$, $V_{CE} = 500\text{ V}$, $T_{vj} = 150^\circ\text{C}$

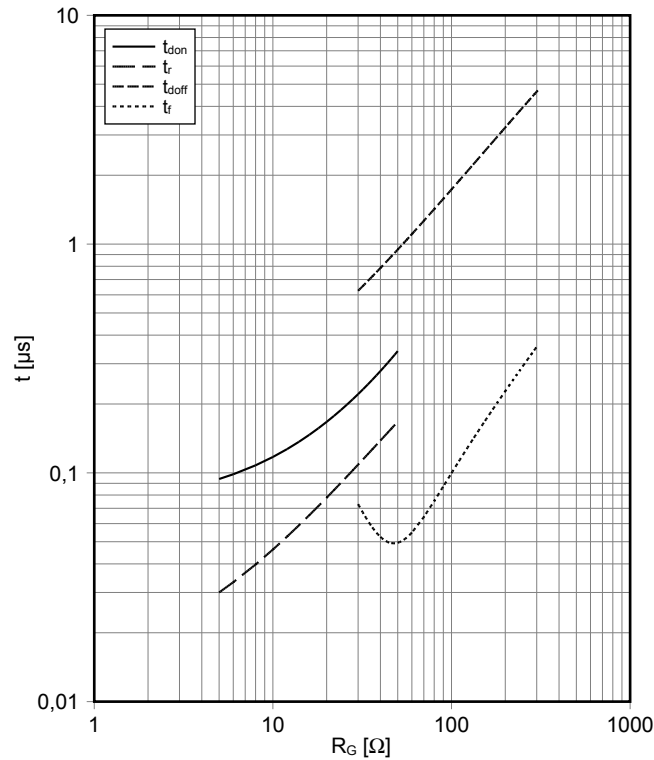


??? IGBT, T5 / T6 (典型)

switching times IGBT, T5 / T6 (typical)

$t_{don} = f(R_G)$, $t_r = f(R_G)$, $t_{doff} = f(R_G)$, $t_f = f(R_G)$

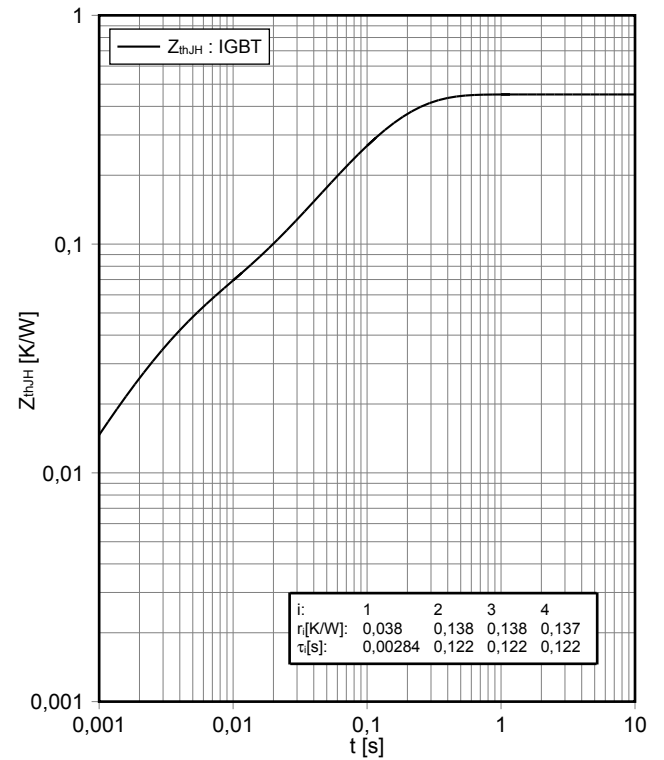
$V_{GE} = \pm 15\text{ V}$, $I_C = 150\text{ A}$, $V_{CE} = 500\text{ V}$, $T_{vj} = 150^\circ\text{C}$



瞬态热阻抗 IGBT, T5 / T6

transient thermal impedance IGBT, T5 / T6

$Z_{thJH} = f(t)$

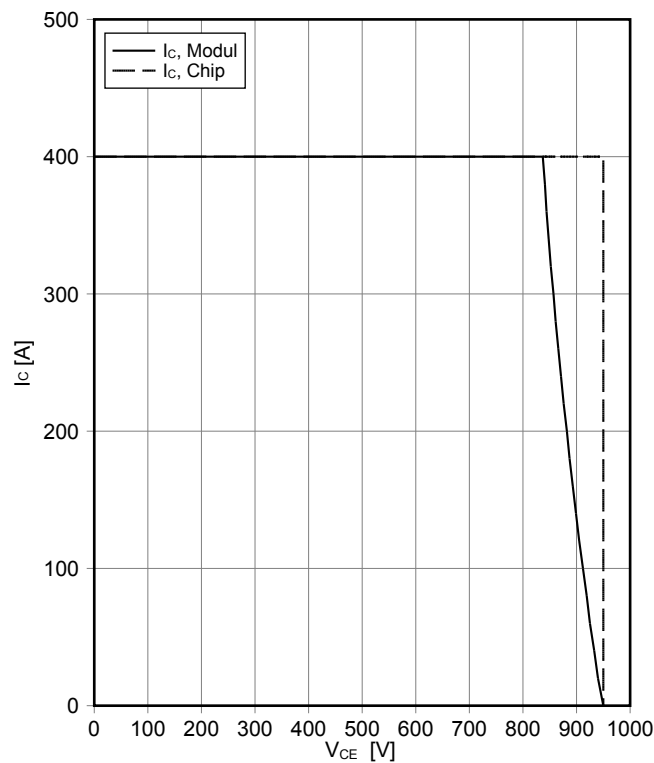


反偏安全工作区 IGBT, T5 / T6 (RBSOA)

reverse bias safe operating area IGBT, T5 / T6 (RBSOA)

$I_C = f(V_{CE})$

$V_{GE} = \pm 15\text{ V}$, $R_{Goff} = 30\ \Omega$, $T_{vj} = 150^\circ\text{C}$

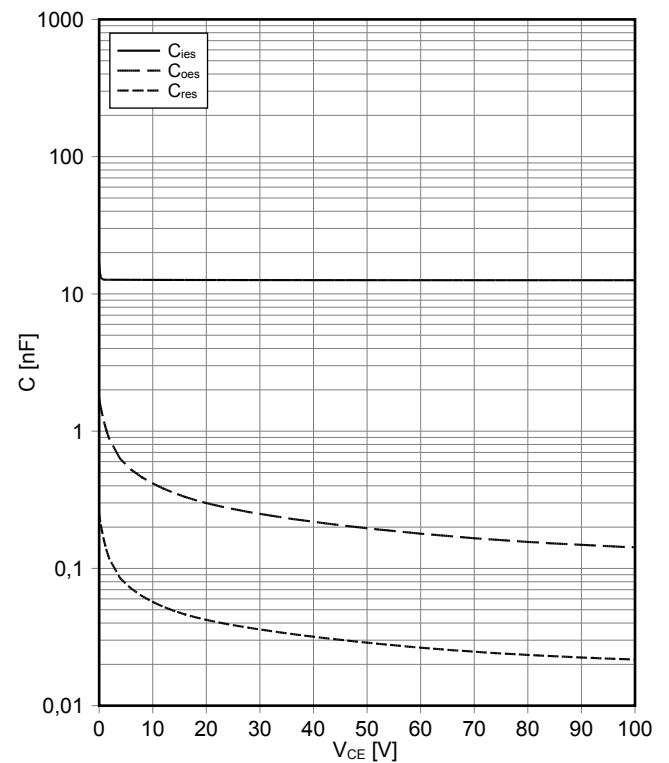


电容特性 IGBT, T5 / T6 (典型)

capacity characteristic IGBT, T5 / T6 (typical)

$C = f(V_{CE})$

$V_{GE} = 0\text{ V}$, $T_{vj} = 25^\circ\text{C}$, $f = 100\text{ kHz}$

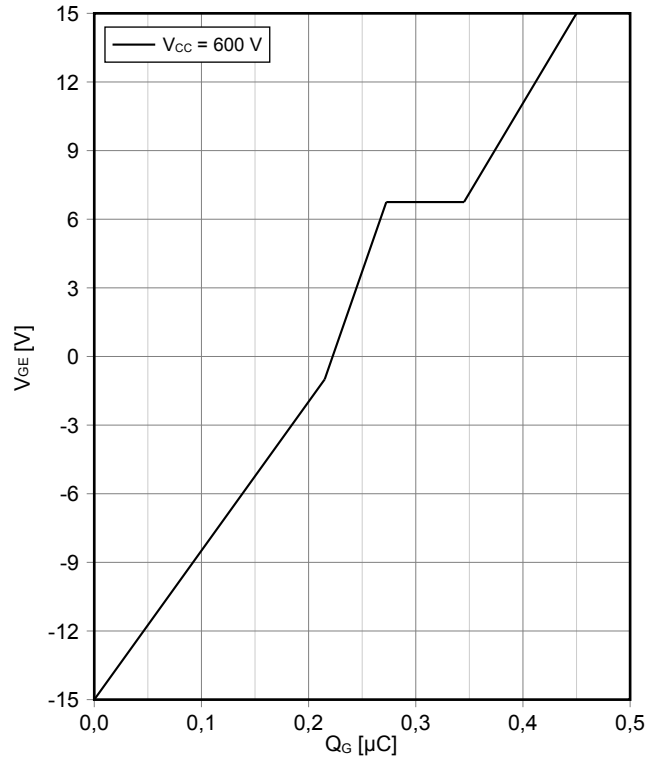


栅极电荷特性 IGBT, T5 / T6 (典型)

gate charge characteristic IGBT, T5 / T6 (typical)

$V_{GE} = f(Q_G)$

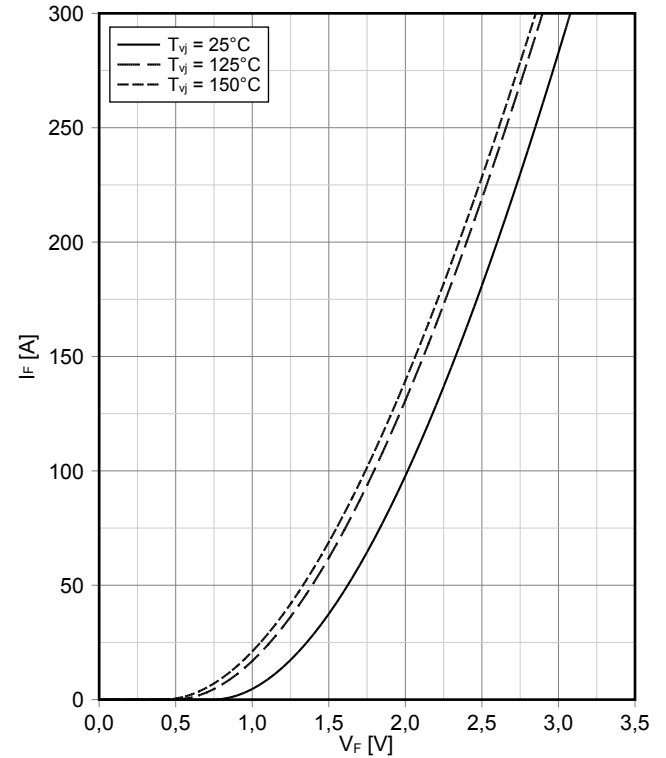
$I_C = 200\text{ A}$, $T_{vj} = 25^\circ\text{C}$



正向偏压特性 二极管, D1 / D4 (典型)

forward characteristic of Diode, D1 / D4 (typical)

$I_F = f(V_F)$

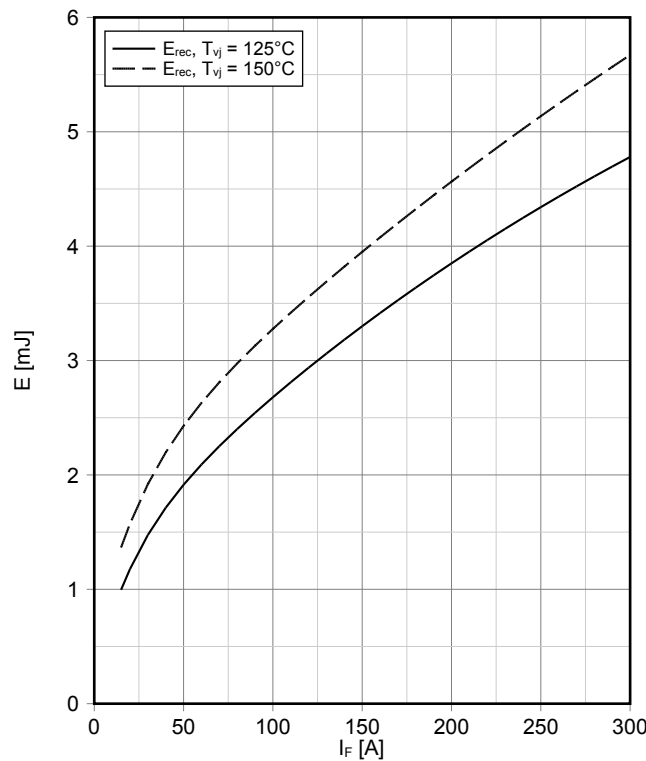


开关损耗 二极管, D1 / D4 (典型)

switching losses Diode, D1 / D4 (typical)

$E_{rec} = f(I_F)$

$R_{Gon} = 5\ \Omega$, $V_{CE} = 500\text{ V}$

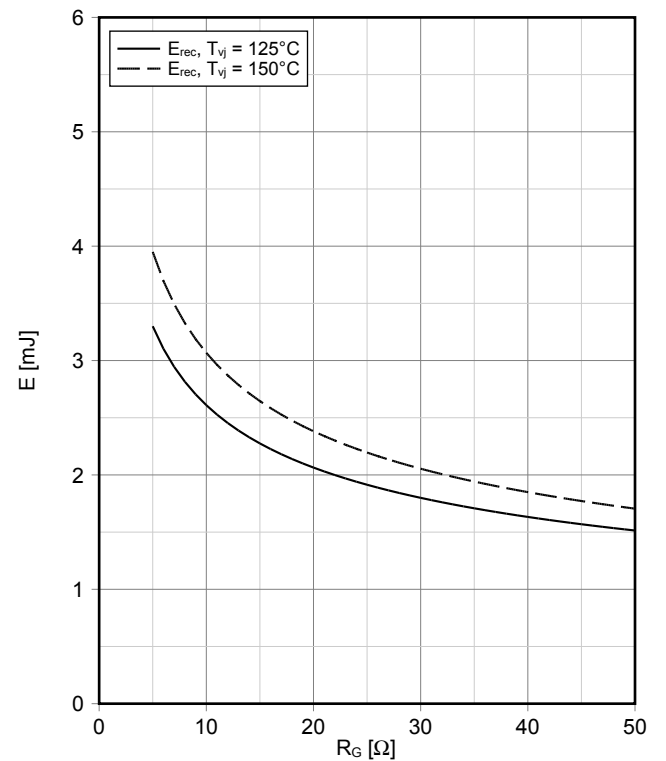


开关损耗 二极管, D1 / D4 (典型)

switching losses Diode, D1 / D4 (typical)

$E_{rec} = f(R_G)$

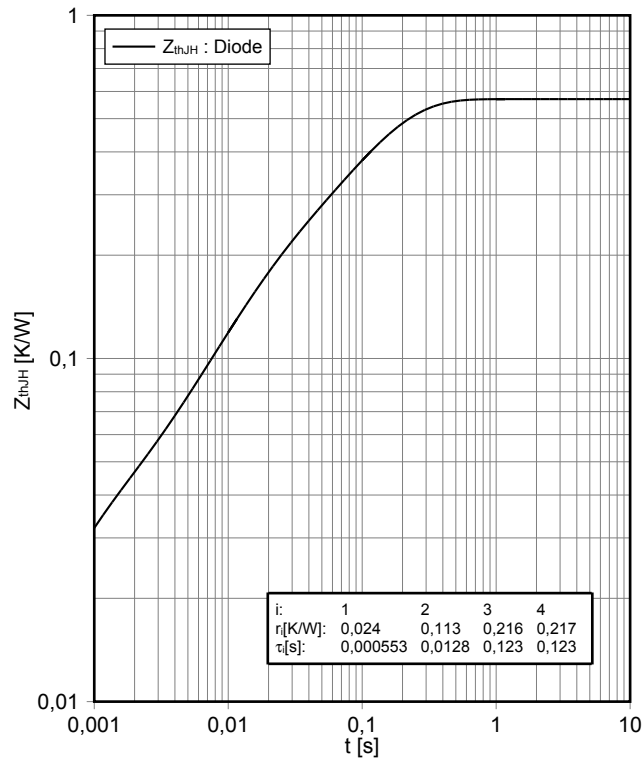
$I_F = 150\text{ A}$, $V_{CE} = 500\text{ V}$



瞬态热阻抗 二极管, D1 / D4

transient thermal impedance Diode, D1 / D4

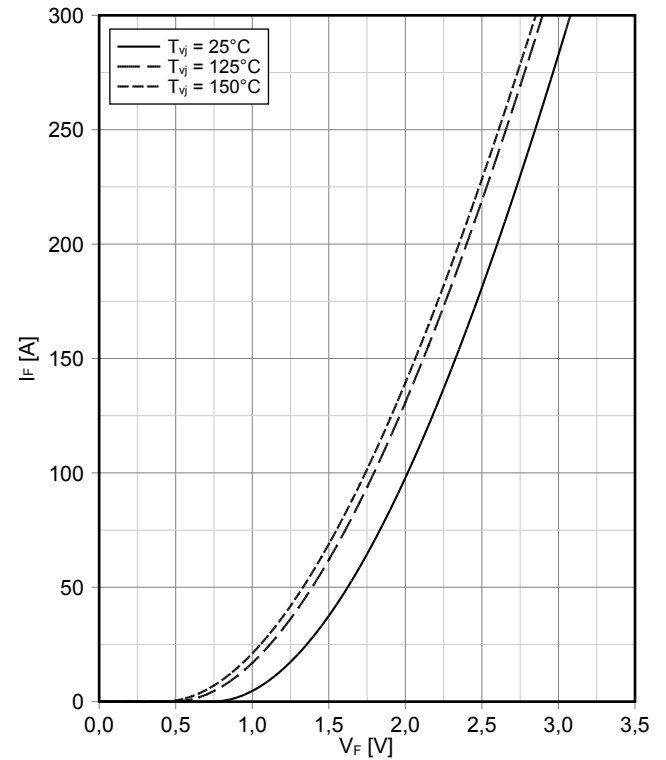
$Z_{thJH} = f(t)$



正向偏压特性 二极管, D2 / D3 (典型)

forward characteristic of Diode, D2 / D3 (typical)

$I_F = f(V_F)$

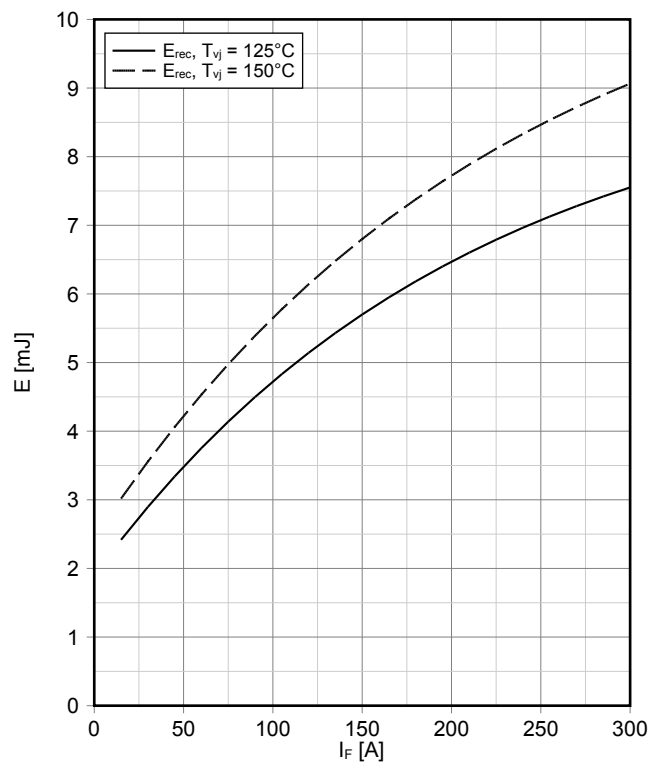


开关损耗 二极管, D2 / D3 (典型)

switching losses Diode, D2 / D3 (typical)

$E_{rec} = f(I_F)$

$R_{Gon} = 5 \Omega$, $V_{CE} = 500 V$

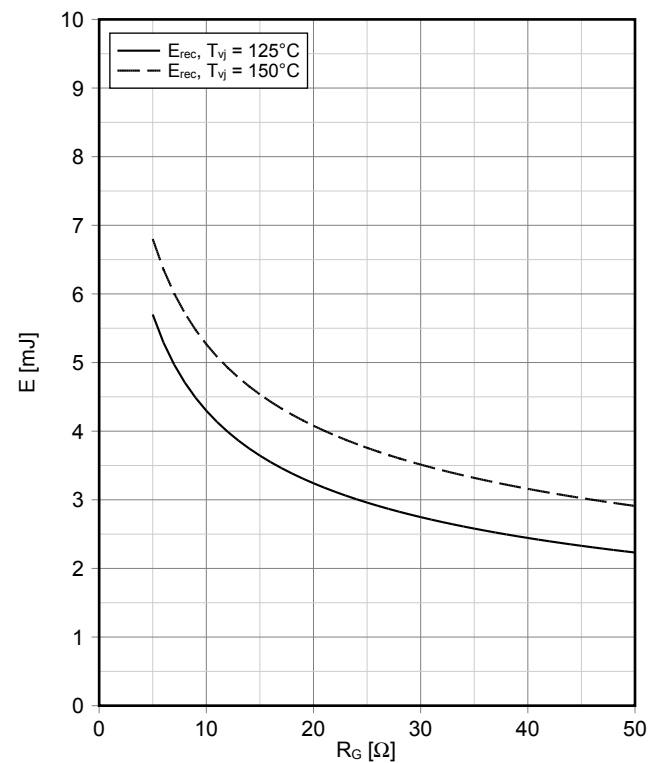


开关损耗 二极管, D2 / D3 (典型)

switching losses Diode, D2 / D3 (typical)

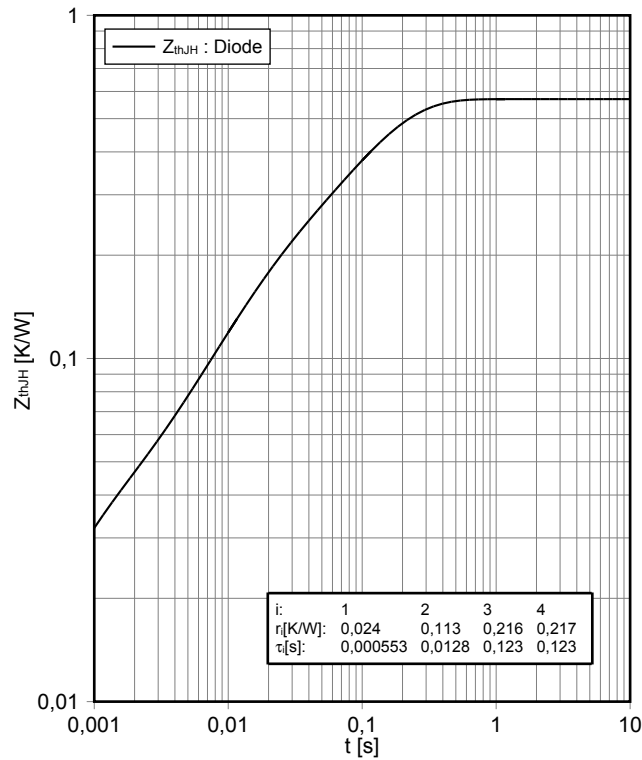
$E_{rec} = f(R_G)$

$I_F = 150 A$, $V_{CE} = 500 V$



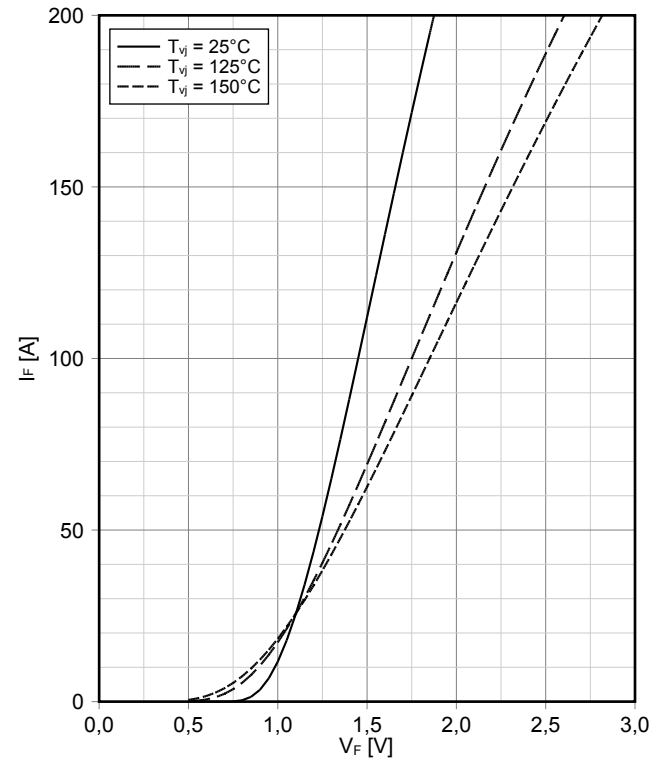
瞬态热阻抗 二极管, D2 / D3

transient thermal impedance Diode, D2 / D3

 $Z_{thJH} = f(t)$ 

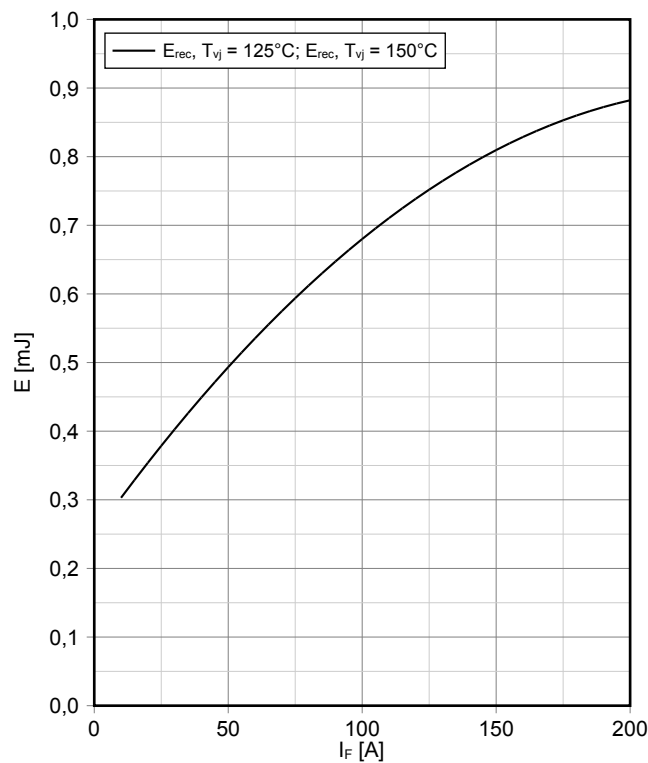
正向偏压特性 二极管, D5-D6 (典型)

forward characteristic of Diode, D5-D6 (typical)

 $I_F = f(V_F)$ 

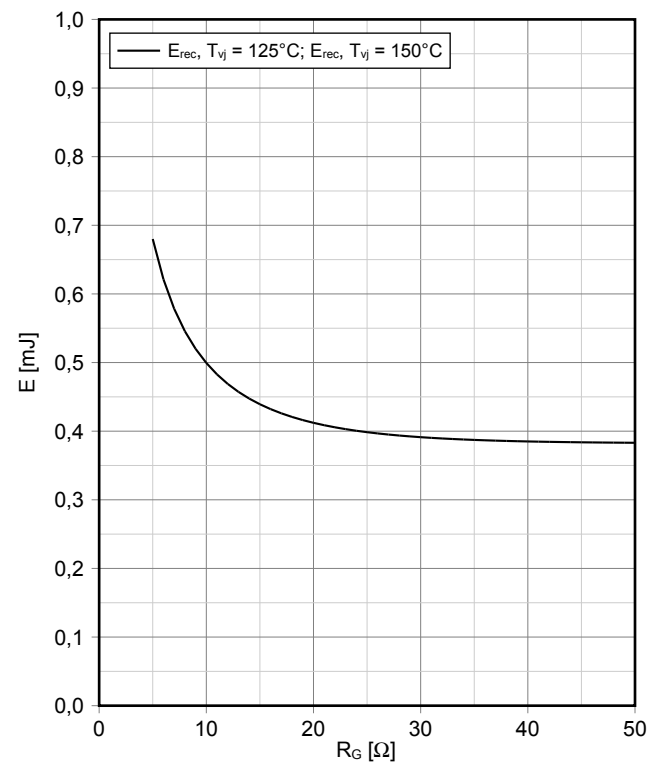
开关损耗 二极管, D5-D6 (典型)

switching losses Diode, D5-D6 (typical)

 $E_{rec} = f(I_F)$ $R_{Gon} = 5 \Omega$, $V_{CE} = 500 V$ 

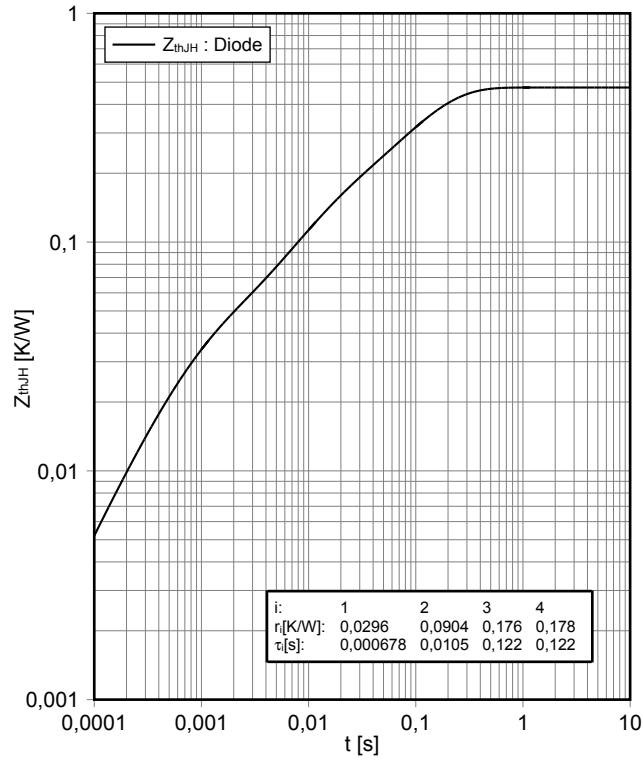
开关损耗 二极管, D5-D6 (典型)

switching losses Diode, D5-D6 (typical)

 $E_{rec} = f(R_G)$ $I_F = 100 A$, $V_{CE} = 500 V$ 

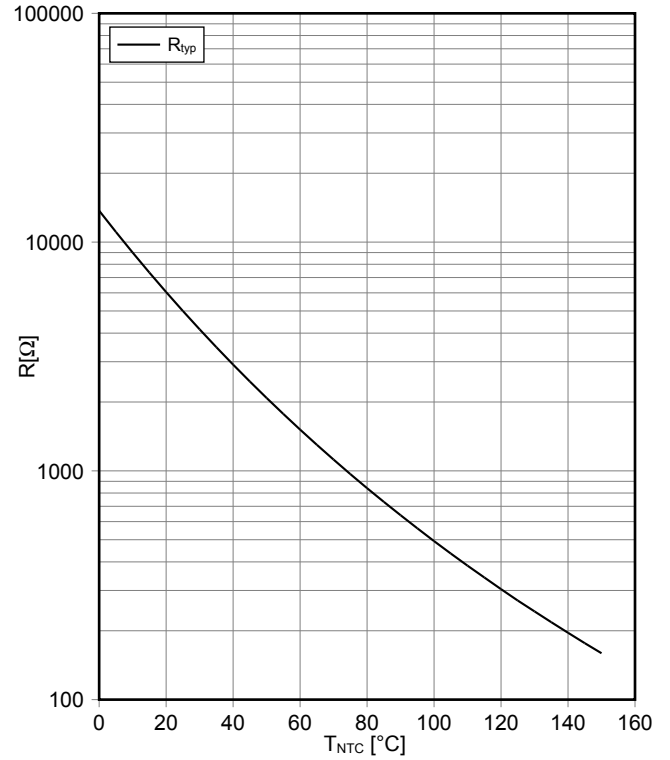
瞬态热阻抗 二极管, D5-D6

transient thermal impedance Diode, D5-D6

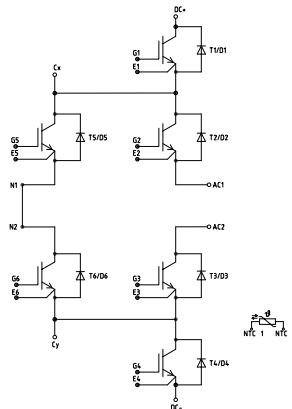
 $Z_{thJH} = f(t)$ 

负温度系数热敏电阻 温度特性

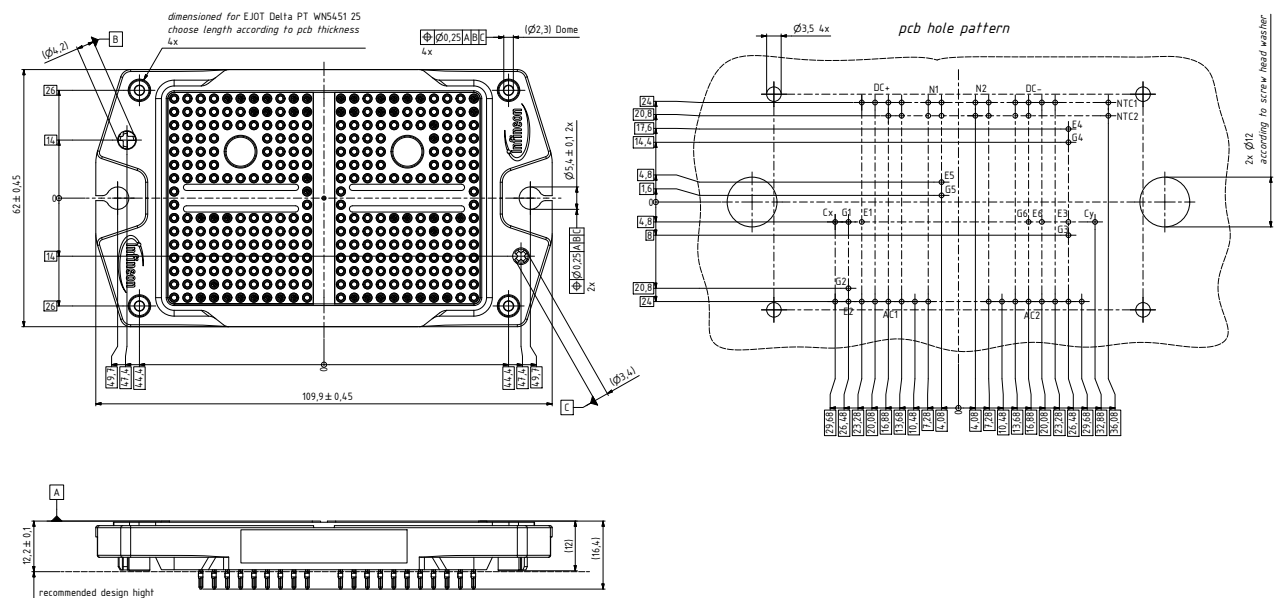
NTC-Thermistor-temperature characteristic (typical)

 $R = f(T)$ 

接线图 / Circuit diagram



封装尺寸 / Package outlines



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