

Final datasheet

EasyPACK™ 模块 采用 CoolSiC™ Trench MOSFET 带有 PressFIT 压接管脚和温度检测 NTC

特性

- 电气特性
 - $V_{DS} = 2000\text{ V}$
 - $I_{DN} = 100\text{ A} / I_{DRM} = 200\text{ A}$
 - 过载操作达 175°C
 - 可以从下面链接寻找适合的英飞凌驱动 IC <https://www.infineon.com/gdfinder>
- 机械特性
 - 低热阻的氮化铝 (AlN) 衬底
 - 高爬电距离和电气间隙
 - 集成 NTC 温度传感器
 - PressFIT 压接技术



Typical appearance

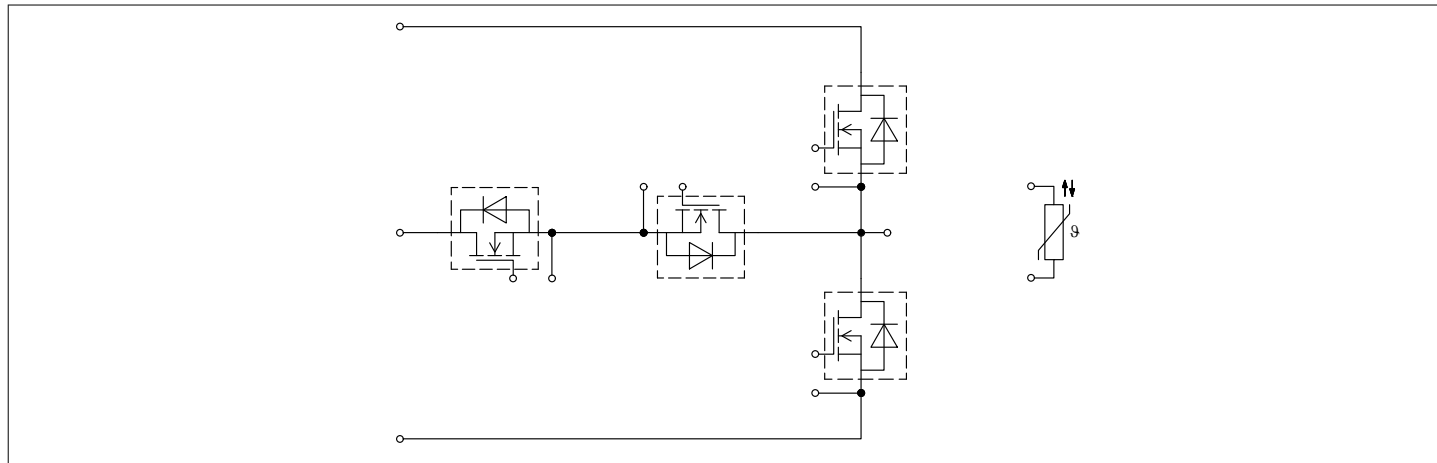
可选应用

- 电动汽车充电
- 三电平应用
- 储能系统 (ESS)
- 太阳能应用

产品认证

- 根据 IEC 60747、60749 和 60068 标准的相关测试，符合工业应用的要求。

描述





内容

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1 封装

表 1 绝缘参数

特征参数	代号	标注或测试条件	数值	单位
绝缘测试电压	V_{ISOL}	RMS, $f = 50 \text{ Hz}$, $t = 1 \text{ min}$	3.2	kV
NTC 绝缘测试电压	$V_{ISOL(NTC)}$	RMS, $f = 50 \text{ Hz}$, $t = 1 \text{ min}$	3.2	kV
内部绝缘		基本绝缘 (class 1, IEC 61140)	AIN	
相对电痕指数	CTI		> 200	
相对温度指数 (电)	RTI	封装	140	°C

表 2 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
杂散电感, 模块	L_{sCE}			22		nH
模块引线电阻, 端子-芯片	$R_{CC'+EE'}$	$T_H = 25 \text{ °C}$, 每个开关		2.5		mΩ
储存温度	T_{stg}		-40		125	°C
Mounting force per clamp	F		40		80	N
重量	G			39		g

注: The current under continuous operation is limited to 25 A RMS per connector pin.

2 MOSFET, T1 / T2

表 3 最大标定值

特征参数	代号	标注或测试条件		数值	单位
漏源极电压	V_{DSS}		$T_{vj} = 25 \text{ °C}$	2000	V
植入漏极电流	I_{DN}			160	A
连续漏极直流电流	I_{DDC}	$T_{vj} = 175 \text{ °C}$, $V_{GS} = 18 \text{ V}$	$T_H = 65 \text{ °C}$	155	A
漏极重复峰值电流	I_{DRM}	verified by design, t_p limited by T_{vjmax}		320	A
栅-源瞬态最大电压	V_{GS}			-10/23	V
栅-源稳态最大电压	V_{GS}			-7/20	V

表 4 推荐值

特征参数	代号	标注或测试条件	[ZH]Values	单位
通态栅极电压	$V_{GS(on)}$		15...18	V
断态栅极电压	$V_{GS(off)}$		-5...-2	V

表 5 特征值

特征参数	代号	标注或测试条件		数值			单位
				最小值	典型值	最大值	
漏源通态电阻	$R_{DS(on)}$	$I_D = 100\text{ A}$	$V_{GS} = 18\text{ V}, T_{vj} = 25\text{ °C}$		5.1	8.7	$\text{m}\Omega$
			$V_{GS} = 18\text{ V}, T_{vj} = 125\text{ °C}$		10.7		
			$V_{GS} = 18\text{ V}, T_{vj} = 175\text{ °C}$		15.2		
			$V_{GS} = 15\text{ V}, T_{vj} = 25\text{ °C}$		5.5		
栅极阈值电压	$V_{GS(th)}$	$I_D = 112\text{ mA}, V_{DS} = V_{GS}, (\text{tested after 1ms pulse at } V_{GS} = +20\text{ V}), T_{vj} = 25\text{ °C}$		3.45	4.3	5.15	V
栅极电荷	Q_G	$V_{DD} = 1200\text{ V}, V_{GS} = -3\text{ V}, T_{vj} = 25\text{ °C}$			0.78		μC
内部栅极电阻	R_{Gint}	$T_{vj} = 25\text{ °C}$			1.8		Ω
输入电容	C_{ISS}	$f = 100\text{ kHz}, V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$		24.1		nF
输出电容	C_{OSS}	$f = 100\text{ kHz}, V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$		0.563		nF
反向传输电容	C_{rss}	$f = 100\text{ kHz}, V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$		0.041		nF
C_{OSS} 存储能量	E_{OSS}	$V_{DS} = 1200\text{ V}, V_{GS} = -3\text{ V}, T_{vj} = 25\text{ °C}$			508		μJ
漏源泄漏电流	I_{DSS}	$V_{DS} = 2000\text{ V}, V_{GS} = -3\text{ V}$	$T_{vj} = 25\text{ °C}$		0.04	378	μA
栅极漏电流	I_{GSS}	$V_{DS} = 0\text{ V}, T_{vj} = 25\text{ °C}$	$V_{GS} = 20\text{ V}$			400	nA
开通延迟时间(感性负载)	$t_{d on}$	$I_D = 100\text{ A}, R_{Gon} = 5.1\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}, t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ °C}$		79		ns
			$T_{vj} = 125\text{ °C}$		77		
			$T_{vj} = 175\text{ °C}$		75		
上升时间(感性负载)	t_r	$I_D = 100\text{ A}, R_{Gon} = 5.1\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}, t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ °C}$		77		ns
			$T_{vj} = 125\text{ °C}$		74		
			$T_{vj} = 175\text{ °C}$		74		
关断延迟时间(感性负载)	$t_{d off}$	$I_D = 100\text{ A}, R_{Goff} = 0.51\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}$	$T_{vj} = 25\text{ °C}$		107		ns
			$T_{vj} = 125\text{ °C}$		117		
			$T_{vj} = 175\text{ °C}$		121		
下降时间(感性负载)	t_f	$I_D = 100\text{ A}, R_{Goff} = 0.51\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}$	$T_{vj} = 25\text{ °C}$		18		ns
			$T_{vj} = 125\text{ °C}$		19		
			$T_{vj} = 175\text{ °C}$		19		

(待续)

表 5 (续) 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
开通损耗能量 (每脉冲)	E_{on}	$I_D = 100\text{ A}$, $V_{DD} = 750\text{ V}$, $L_\sigma = 15\text{ nH}$, $V_{GS} = -3/18\text{ V}$, $R_{Gon} = 5.1\ \Omega$, $di/dt = 4.3\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ }^\circ\text{C}$), $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ }^\circ\text{C}$	3.5		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	3.8		
			$T_{vj} = 175\text{ }^\circ\text{C}$	4.1		
开通损耗能量 (每脉冲), 优化条件下	$E_{on,o}$	$I_D = 100\text{ A}$, $V_{DD} = 750\text{ V}$, $L_\sigma = 15\text{ nH}$, $V_{GS} = -3/18\text{ V}$, $R_{Gon,o} = 3\ \Omega$, $di/dt = 5.6\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ }^\circ\text{C}$), $t_{dead} = 100\text{ ns}$	$T_{vj} = 25\text{ }^\circ\text{C}$	2.4		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	2.5		
			$T_{vj} = 175\text{ }^\circ\text{C}$	2.6		
关断损耗能量 (每脉冲)	E_{off}	$I_D = 100\text{ A}$, $V_{DD} = 750\text{ V}$, $L_\sigma = 15\text{ nH}$, $V_{GS} = -3/18\text{ V}$, $R_{Goff} = 0.51\ \Omega$, $dv/dt = 31.6\text{ kV}/\mu\text{s}$ ($T_{vj} = 175\text{ }^\circ\text{C}$)	$T_{vj} = 25\text{ }^\circ\text{C}$	0.71		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.74		
			$T_{vj} = 175\text{ }^\circ\text{C}$	0.77		
结—散热器热阻	R_{thJH}	每个 MOSFET, $\lambda_{grease} = 5\text{ W}/(\text{m}\cdot\text{K})$		0.164		K/W
允许开关的温度范围	$T_{vj\text{ op}}$		-40		175	$^\circ\text{C}$

注: The selection of positive and negative gate-source voltages impacts losses and the long-term behavior of the MOSFET and body diode. The design guidelines described in Application Notes AN 2018-09 and AN 2021-13 must be considered to ensure sound operation of the device over the planned lifetime.

$T_{vj\text{ op}} > 150\text{ }^\circ\text{C}$ is allowed for operation at overload conditions. For detailed specifications, please refer to AN 2018-14.

3 Body diode (MOSFET, T1 / T2)

表 6 最大标定值

特征参数	代号	标注或测试条件	数值	单位
体二极管正向直流电流	I_{SD}	$T_{vj} = 175\text{ }^\circ\text{C}$, $V_{GS} = -3\text{ V}$, $T_H = 65\text{ }^\circ\text{C}$	120	A

表 7 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
正向电压	V_{SD}	$I_{SD} = 100\text{ A}$, $V_{GS} = -3\text{ V}$	$T_{vj} = 25\text{ }^\circ\text{C}$	4	5.55	V
			$T_{vj} = 125\text{ }^\circ\text{C}$	3.65		
			$T_{vj} = 175\text{ }^\circ\text{C}$	3.6		

(待续)

表 7 (续) 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
反向恢复峰值电流	I_{rrm}	$I_{SD} = 100\text{ A}$, $di_s/dt = 8.1\text{ kA}/\mu\text{s}$, $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ °C}$	127		A
			$T_{vj} = 125\text{ °C}$	167		
			$T_{vj} = 175\text{ °C}$	211		
恢复电荷	Q_{rr}	$I_{SD} = 100\text{ A}$, $di_s/dt = 8.1\text{ kA}/\mu\text{s}$, $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ °C}$	2		μC
			$T_{vj} = 125\text{ °C}$	3.9		
			$T_{vj} = 175\text{ °C}$	5.9		
反向恢复损耗（每脉冲）	E_{rec}	$I_{SD} = 100\text{ A}$, $di_s/dt = 8.1\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$), $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ °C}$	0.55		mJ
			$T_{vj} = 125\text{ °C}$	1.6		
			$T_{vj} = 175\text{ °C}$	2.6		
反向恢复损耗（每脉冲）， 优化条件下	$E_{rec,o}$	$I_{SD} = 100\text{ A}$, $di_s/dt = 11.3\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ °C}$), $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 100\text{ ns}$	$T_{vj} = 25\text{ °C}$	0.85		mJ
			$T_{vj} = 125\text{ °C}$	1		
			$T_{vj} = 175\text{ °C}$	1.3		

4 MOSFET, T3 / T4

表 8 最大标定值

特征参数	代号	标注或测试条件	数值	单位
漏源极电压	V_{DSS}	$T_{vj} = 25\text{ °C}$	1200	V
连续漏极直流电流	I_{DDC}	$T_{vj} = 175\text{ °C}$, $V_{GS} = 18\text{ V}$, $T_H = 100\text{ °C}$	100	A
漏极重复峰值电流	I_{DRM}	verified by design, t_p limited by T_{vjmax}	200	A
栅-源瞬态最大电压	V_{GS}		-10/23	V
栅-源稳态最大电压	V_{GS}		-7/20	V

表 9 推荐值

特征参数	代号	标注或测试条件	[ZH]Values	单位
通态栅极电压	$V_{GS(on)}$		15...18	V
断态栅极电压	$V_{GS(off)}$		-5...0	V

表 10 特征值

特征参数	代号	标注或测试条件		数值			单位
				最小值	典型值	最大值	
漏源通态电阻	$R_{DS(on)}$	$I_D = 100\text{ A}$	$V_{GS} = 18\text{ V}, T_{vj} = 25\text{ °C}$		8.1	12	$\text{m}\Omega$
			$V_{GS} = 18\text{ V}, T_{vj} = 125\text{ °C}$		13.1		
			$V_{GS} = 18\text{ V}, T_{vj} = 175\text{ °C}$		17.4		
			$V_{GS} = 15\text{ V}, T_{vj} = 25\text{ °C}$		9.7		
栅极阈值电压	$V_{GS(th)}$	$I_D = 40\text{ mA}, V_{DS} = V_{GS}, T_{vj} = 25\text{ °C}, (\text{tested after } 1\text{ms pulse at } V_{GS} = +20\text{ V}), T_{vj} = 25\text{ °C}$		3.45	4.3	5.15	V
栅极电荷	Q_G	$V_{DD} = 800\text{ V}, V_{GS} = -3/18\text{ V}, T_{vj} = 25\text{ °C}$			0.297		μC
内部栅极电阻	R_{Gint}	$T_{vj} = 25\text{ °C}$			2.1		Ω
输入电容	C_{ISS}	$f = 100\text{ kHz}, V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$		8.8		nF
输出电容	C_{OSS}	$f = 100\text{ kHz}, V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$		0.42		nF
反向传输电容	C_{rss}	$f = 100\text{ kHz}, V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}$	$T_{vj} = 25\text{ °C}$		0.028		nF
C_{OSS} 存储能量	E_{OSS}	$V_{DS} = 800\text{ V}, V_{GS} = 0\text{ V}, T_{vj} = 25\text{ °C}$			172		μJ
漏源泄漏电流	I_{DSS}	$V_{DS} = 100\text{ V}, V_{GS} = -3\text{ V}$	$T_{vj} = 25\text{ °C}$		0.06	380	μA
栅极漏电流	I_{GSS}	$V_{DS} = 0\text{ V}, T_{vj} = 25\text{ °C}$	$V_{GS} = -3\text{ V}$			400	nA
开通延迟时间(感性负载)	$t_{d on}$	$I_D = 100\text{ A}, R_{Gon} = 3.9\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}, t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ °C}$		38		ns
			$T_{vj} = 125\text{ °C}$		37		
			$T_{vj} = 175\text{ °C}$		36		
上升时间(感性负载)	t_r	$I_D = 100\text{ A}, R_{Gon} = 3.9\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}, t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ °C}$		42		ns
			$T_{vj} = 125\text{ °C}$		47		
			$T_{vj} = 175\text{ °C}$		51		
关断延迟时间(感性负载)	$t_{d off}$	$I_D = 100\text{ A}, R_{Goff} = 2.4\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}$	$T_{vj} = 25\text{ °C}$		80		ns
			$T_{vj} = 125\text{ °C}$		81		
			$T_{vj} = 175\text{ °C}$		83		
下降时间(感性负载)	t_f	$I_D = 100\text{ A}, R_{Goff} = 2.4\text{ }\Omega, V_{DD} = 750\text{ V}, V_{GS} = -3/18\text{ V}$	$T_{vj} = 25\text{ °C}$		19		ns
			$T_{vj} = 125\text{ °C}$		19		
			$T_{vj} = 175\text{ °C}$		19		

(待续)

表 10 (续) 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
开通损耗能量 (每脉冲)	E_{on}	$I_D = 100\text{ A}$, $V_{DD} = 750\text{ V}$, $L_\sigma = 15\text{ nH}$, $V_{GS} = -3/18\text{ V}$, $R_{Gon} = 3.9\ \Omega$, $di/dt = 8.1\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ }^\circ\text{C}$), $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ }^\circ\text{C}$	2		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	2.4		
			$T_{vj} = 175\text{ }^\circ\text{C}$	2.8		
开通损耗能量 (每脉冲), 优化条件下	$E_{on,o}$	$I_D = 100\text{ A}$, $V_{DD} = 750\text{ V}$, $L_\sigma = 15\text{ nH}$, $V_{GS} = -3/18\text{ V}$, $R_{Gon,o} = 0.51\ \Omega$, $di/dt = 11.3\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ }^\circ\text{C}$), $t_{dead} = 100\text{ ns}$	$T_{vj} = 25\text{ }^\circ\text{C}$	0.99		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.99		
			$T_{vj} = 175\text{ }^\circ\text{C}$	1.03		
关断损耗能量 (每脉冲)	E_{off}	$I_D = 100\text{ A}$, $V_{DD} = 750\text{ V}$, $L_\sigma = 15\text{ nH}$, $V_{GS} = -3/18\text{ V}$, $R_{Goff} = 2.4\ \Omega$, $dv/dt = 31.6\text{ kV}/\mu\text{s}$ ($T_{vj} = 175\text{ }^\circ\text{C}$)	$T_{vj} = 25\text{ }^\circ\text{C}$	0.52		mJ
			$T_{vj} = 125\text{ }^\circ\text{C}$	0.57		
			$T_{vj} = 175\text{ }^\circ\text{C}$	0.6		
结—散热器热阻	R_{thJH}	每个 MOSFET, $\lambda_{grease} = 5\text{ W}/(\text{m}\cdot\text{K})$		0.288		K/W
允许开关的温度范围	$T_{vj\text{ op}}$		-40		175	$^\circ\text{C}$

注: The selection of positive and negative gate-source voltages impacts losses and the long-term behavior of the MOSFET and body diode. The design guidelines described in Application Notes AN 2018-09 and AN 2021-13 must be considered to ensure sound operation of the device over the planned lifetime.

$T_{vj\text{ op}} > 150\text{ }^\circ\text{C}$ is allowed for operation at overload conditions. For detailed specifications, please refer to AN 2018-14.

5 Body diode (MOSFET, T3 / T4)

表 11 最大标定值

特征参数	代号	标注或测试条件	数值	单位
体二极管正向直流电流	I_{SD}	$T_{vj} = 175\text{ }^\circ\text{C}$, $V_{GS} = -3\text{ V}$ $T_H = 65\text{ }^\circ\text{C}$	80	A

表 12 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
正向电压	V_{SD}	$I_{SD} = 100\text{ A}$, $V_{GS} = -3\text{ V}$	$T_{vj} = 25\text{ }^\circ\text{C}$	4.2	5.35	V
			$T_{vj} = 125\text{ }^\circ\text{C}$	3.9		
			$T_{vj} = 175\text{ }^\circ\text{C}$	3.8		

(待续)

表 12 (续) 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
反向恢复峰值电流	I_{rrm}	$I_{SD} = 100\text{ A}$, $di_s/dt = 4.3\text{ kA}/\mu\text{s}$, $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ }^{\circ}\text{C}$	53		A
			$T_{vj} = 125\text{ }^{\circ}\text{C}$	74		
			$T_{vj} = 175\text{ }^{\circ}\text{C}$	89		
恢复电荷	Q_{rr}	$I_{SD} = 100\text{ A}$, $di_s/dt = 4.3\text{ kA}/\mu\text{s}$, $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ }^{\circ}\text{C}$	1		μC
			$T_{vj} = 125\text{ }^{\circ}\text{C}$	1.8		
			$T_{vj} = 175\text{ }^{\circ}\text{C}$	2.4		
反向恢复损耗（每脉冲）	E_{rec}	$I_{SD} = 100\text{ A}$, $di_s/dt = 4.3\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ }^{\circ}\text{C}$), $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 1000\text{ ns}$	$T_{vj} = 25\text{ }^{\circ}\text{C}$	0.26		mJ
			$T_{vj} = 125\text{ }^{\circ}\text{C}$	0.48		
			$T_{vj} = 175\text{ }^{\circ}\text{C}$	0.64		
反向恢复损耗（每脉冲）， 优化条件下	$E_{rec,o}$	$I_{SD} = 100\text{ A}$, $di_s/dt = 5.6\text{ kA}/\mu\text{s}$ ($T_{vj} = 175\text{ }^{\circ}\text{C}$), $V_{DD} = 750\text{ V}$, $V_{GS} = -3\text{ V}$, $t_{dead} = 100\text{ ns}$	$T_{vj} = 25\text{ }^{\circ}\text{C}$	0.27		mJ
			$T_{vj} = 125\text{ }^{\circ}\text{C}$	0.35		
			$T_{vj} = 175\text{ }^{\circ}\text{C}$	0.43		

6 负温度系数热敏电阻

表 13 特征值

特征参数	代号	标注或测试条件	数值			单位
			最小值	典型值	最大值	
额定电阻值	R_{25}	$T_{NTC} = 25\text{ }^{\circ}\text{C}$		5		$\text{k}\Omega$
R_{100} 偏差	$\Delta R/R$	$T_{NTC} = 100\text{ }^{\circ}\text{C}$, $R_{100} = 493\text{ }\Omega$	-5		5	%
耗散功率	P_{25}	$T_{NTC} = 25\text{ }^{\circ}\text{C}$			20	mW
B-值	$B_{25/50}$	$R_2 = R_{25} \exp[B_{25/50}(1/T_2 - 1/(298,15\text{ K}))]$		3375		K
B-值	$B_{25/80}$	$R_2 = R_{25} \exp[B_{25/80}(1/T_2 - 1/(298,15\text{ K}))]$		3411		K
B-值	$B_{25/100}$	$R_2 = R_{25} \exp[B_{25/100}(1/T_2 - 1/(298,15\text{ K}))]$		3433		K

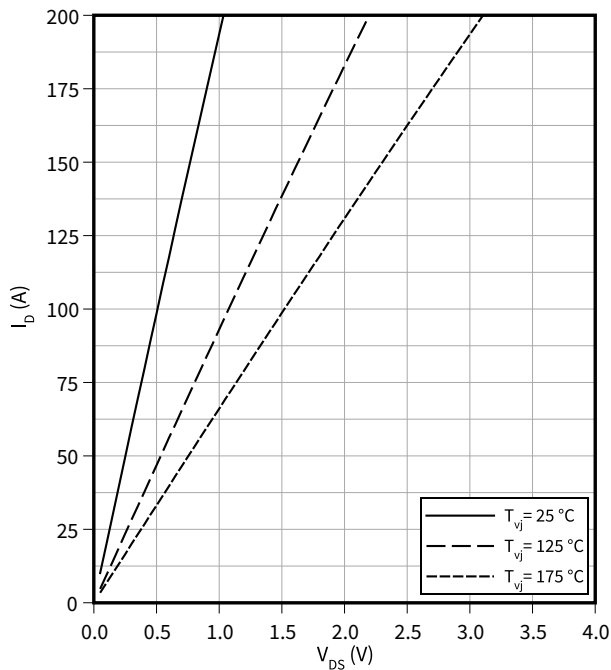
注: NTC 的具体参数分析请见 AN2009-10, 第 4 章

7 特征参数图表

输出特性 (典型), MOSFET, T1 / T2

$I_D = f(V_{DS})$

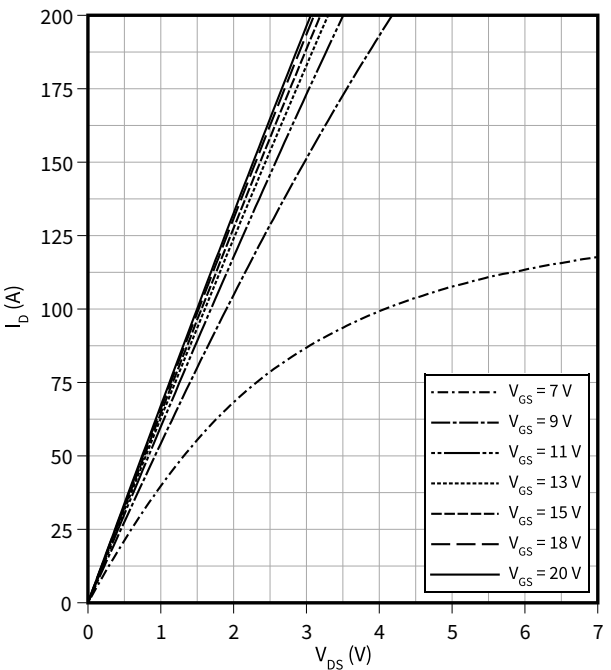
$V_{GS} = 18\text{ V}$



输出特性 (典型), MOSFET, T1 / T2

$I_D = f(V_{DS})$

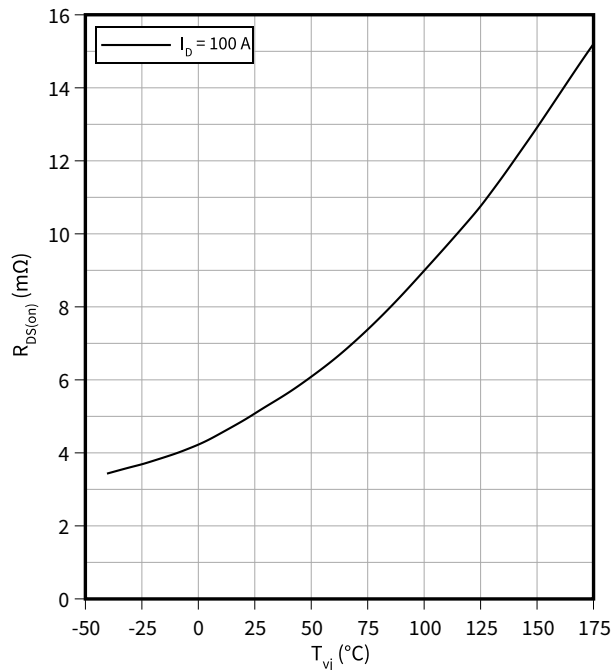
$T_{vj} = 25\text{ °C}$



漏源通态电阻 (典型), MOSFET, T1 / T2

$R_{DS(on)} = f(T_{vj})$

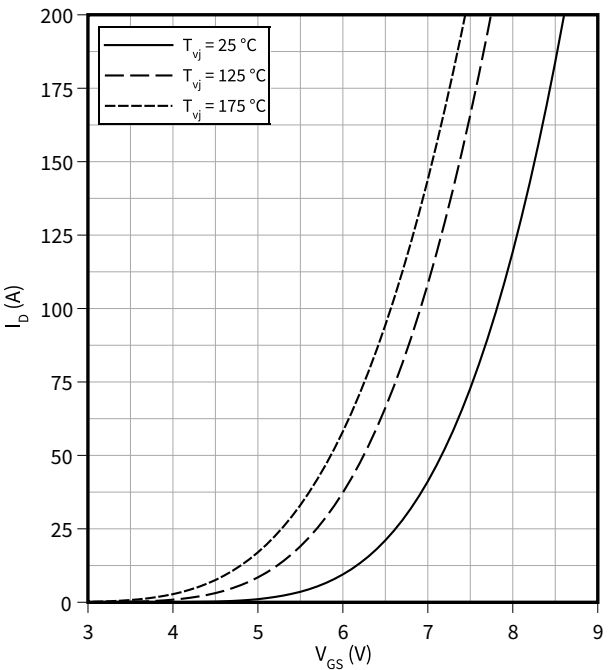
$V_{GS} = 18\text{ V}$



传输特性 (典型), MOSFET, T1 / T2

$I_D = f(V_{GS})$

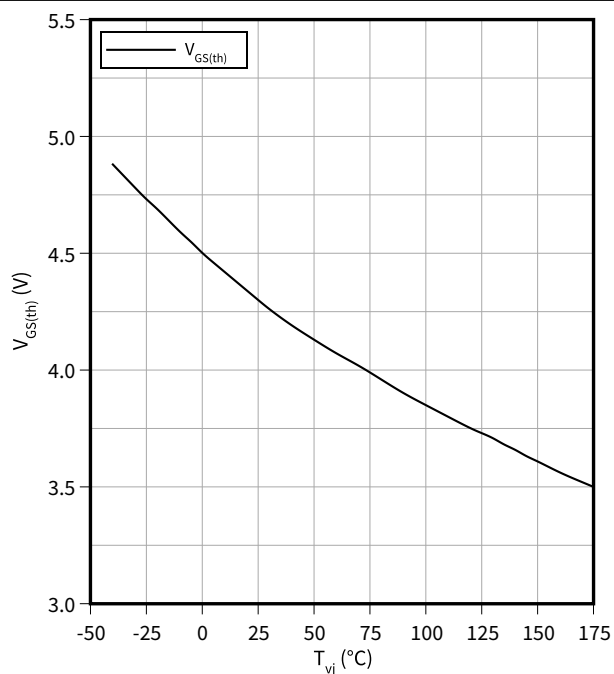
$V_{DS} = 20\text{ V}$



栅-源阈值电压（典型），MOSFET, T1 / T2

$$V_{GS(th)} = f(T_{vj})$$

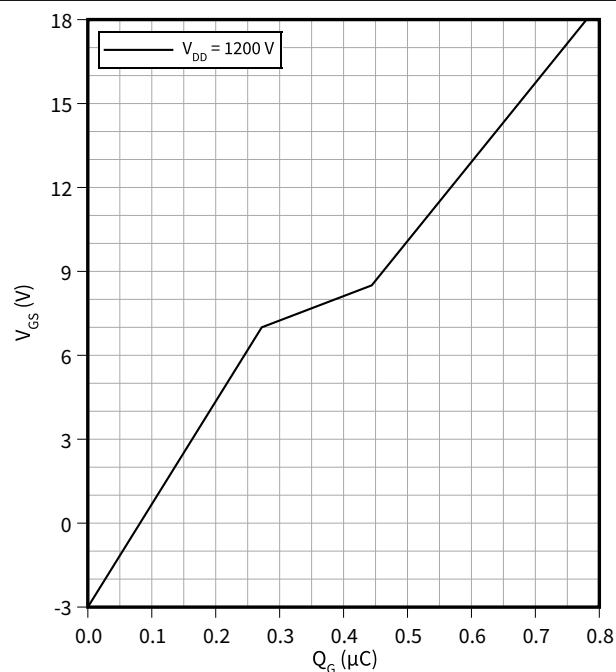
$$I_D = 112 \text{ mA}, V_{GS} = V_{DS}$$



栅极电荷特性（典型），MOSFET, T1 / T2

$$V_{GS} = f(Q_G)$$

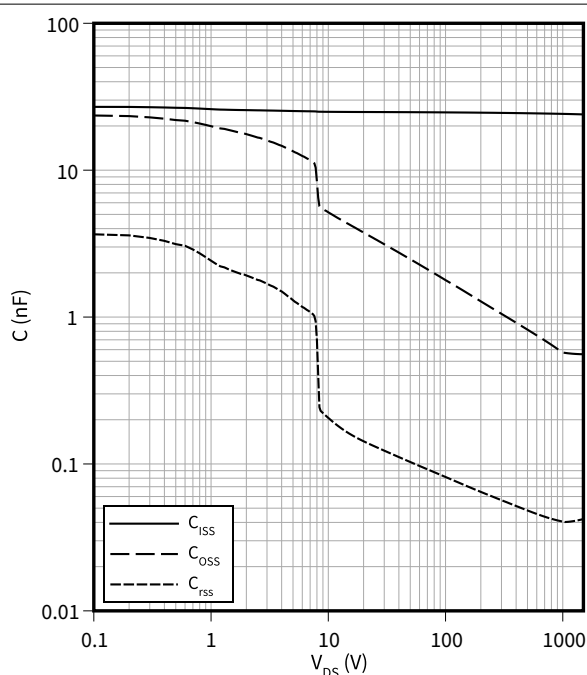
$$I_D = 100 \text{ A}, T_{vj} = 25^\circ\text{C}$$



电容特性（典型），MOSFET, T1 / T2

$$C = f(V_{DS})$$

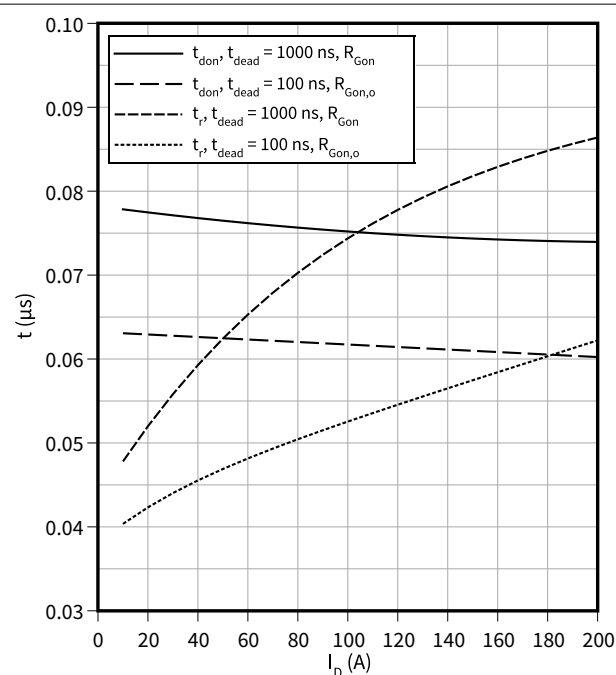
$$f = 100 \text{ kHz}, T_{vj} = 25^\circ\text{C}, V_{GS} = 0 \text{ V}$$



开关时间（典型），MOSFET, T1 / T2

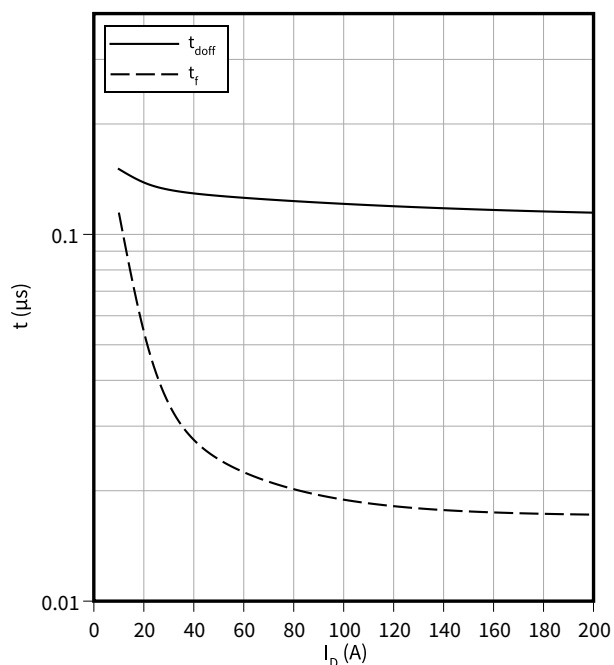
$$t = f(I_D)$$

$$R_{Gon} = 5.1 \Omega, V_{DD} = 750 \text{ V}, R_{Gon,o} = 3 \Omega, T_{vj} = 175^\circ\text{C}, V_{GS} = -3/18 \text{ V}$$



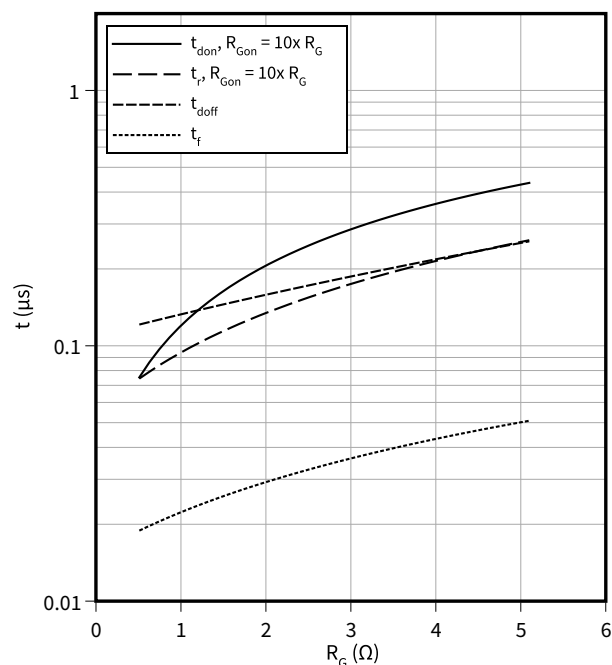
开关时间 (典型), MOSFET, T1 / T2

$t = f(I_D)$

 $R_{Goff} = 0.51 \Omega$, $V_{DD} = 750 \text{ V}$, $T_{vj} = 175 \text{ }^\circ\text{C}$, $V_{GS} = -3/18 \text{ V}$ 

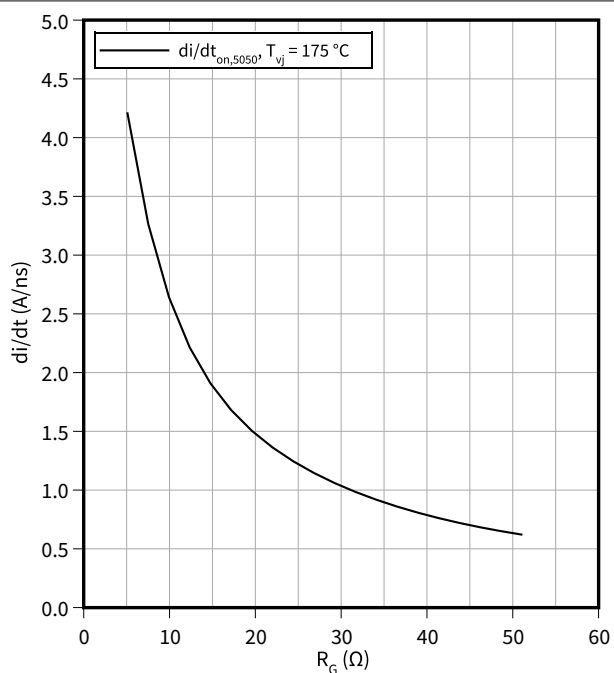
开关时间 (典型), MOSFET, T1 / T2

$t = f(R_G)$

 $V_{DD} = 750 \text{ V}$, $t_{dead} = 1000 \text{ ns}$, $I_D = 100 \text{ A}$, $T_{vj} = 175 \text{ }^\circ\text{C}$, $V_{GS} = -3/18 \text{ V}$ 

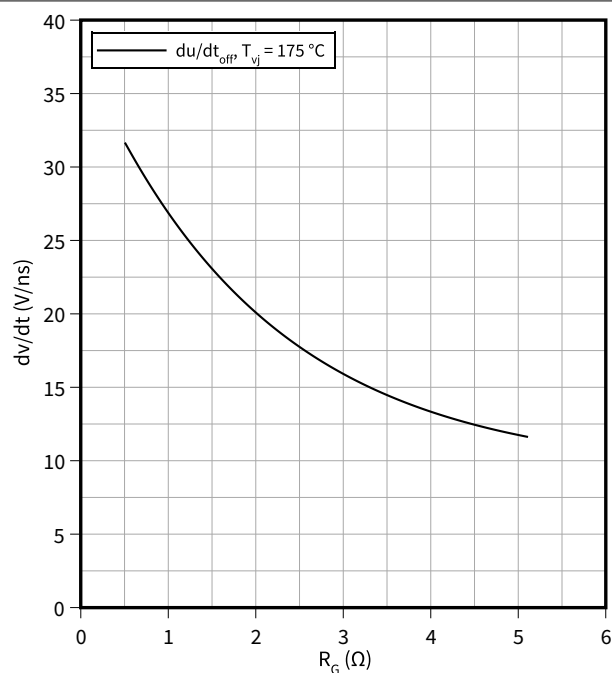
电流变化斜率 (典型), MOSFET, T1 / T2

$di/dt = f(R_G)$

 $V_{DD} = 750 \text{ V}$, $t_{dead} = 1000 \text{ ns}$, $I_D = 100 \text{ A}$, $V_{GS} = -3/18 \text{ V}$ 

电压变化斜率 (典型), MOSFET, T1 / T2

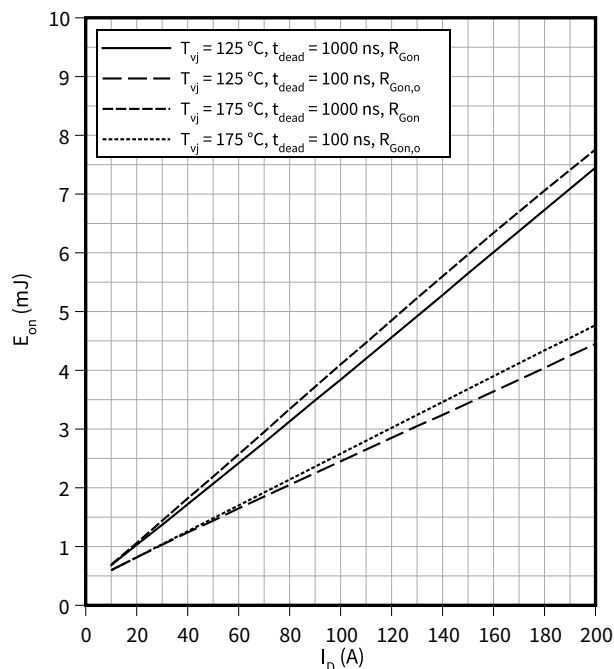
$dv/dt = f(R_G)$

 $V_{DD} = 750 \text{ V}$, $I_D = 100 \text{ A}$, $V_{GS} = -3/18 \text{ V}$ 

开关损耗 (典型), MOSFET, T1 / T2

$$E_{on} = f(I_D)$$

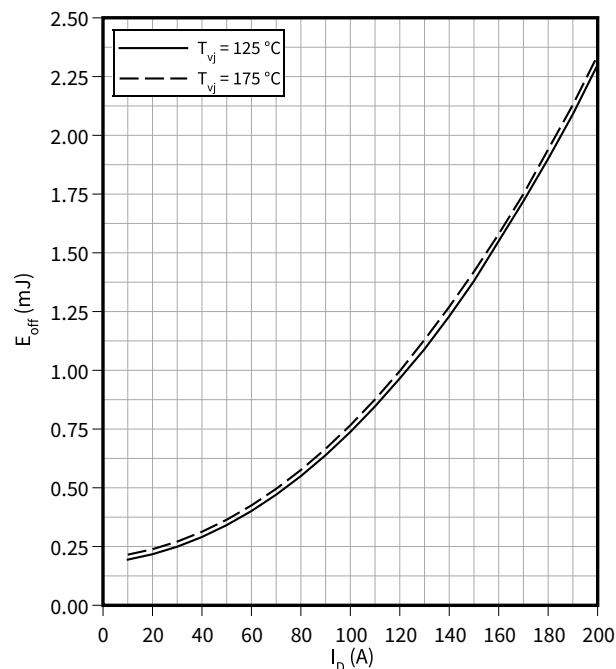
$$V_{DD} = 750 \text{ V}, R_{Gon} = 5.1 \Omega, R_{Gon,o} = 3 \Omega, V_{GS} = -3/18 \text{ V}$$



开关损耗 (典型), MOSFET, T1 / T2

$$E_{off} = f(I_D)$$

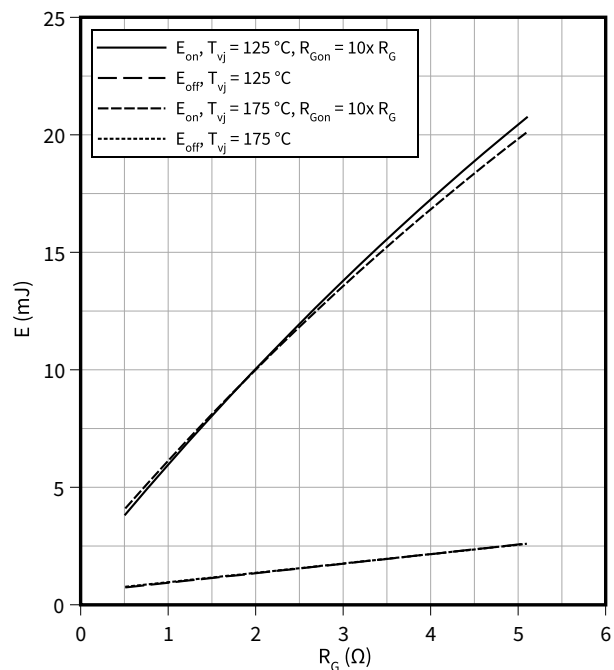
$$R_{Goff} = 0.51 \Omega, V_{DD} = 750 \text{ V}, V_{GS} = -3/18 \text{ V}$$



开关损耗 (典型), MOSFET, T1 / T2

$$E = f(R_G)$$

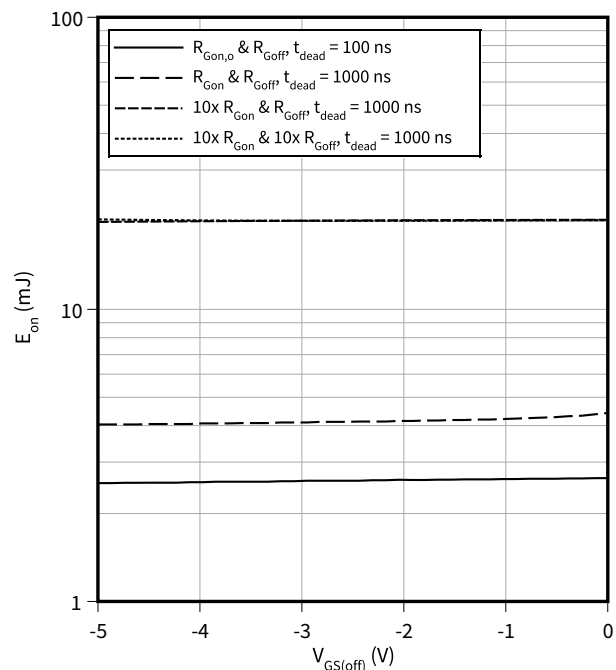
$$V_{DD} = 750 \text{ V}, t_{dead} = 1000 \text{ ns}, I_D = 100 \text{ A}, V_{GS} = -3/18 \text{ V}$$



开关损耗 (典型), MOSFET, T1 / T2

$$E_{on} = f(V_{GS(off)})$$

$$V_{DD} = 750 \text{ V}, I_D = 100 \text{ A}, V_{GS(on)} = 18 \text{ V}, T_{vj} = 175 \text{ °C}$$

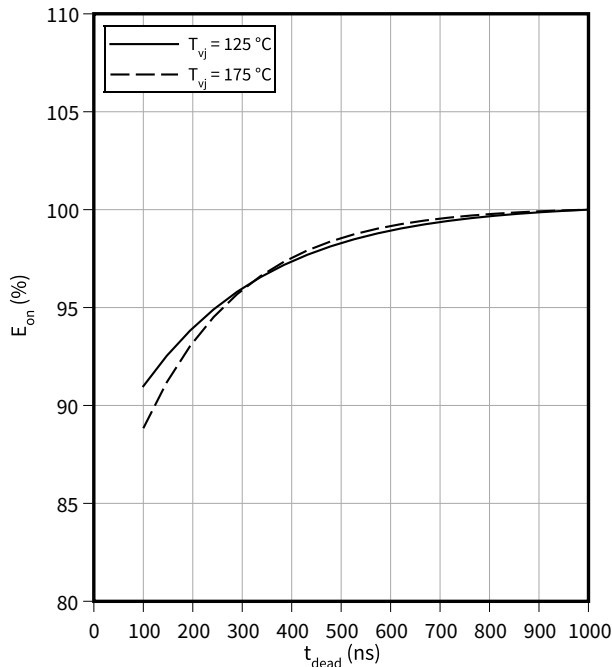


7 特征参数图表

开关损耗（典型）, MOSFET, T1 / T2

$E_{on} = f(t_{dead})$

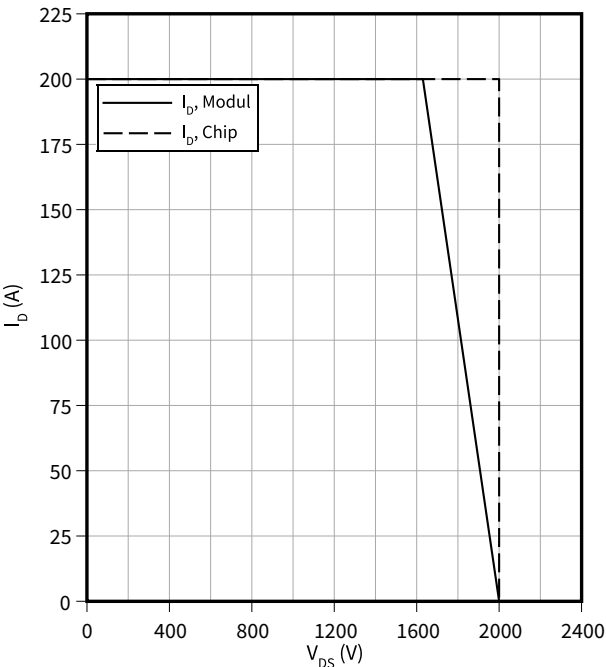
$R_{Gon} = 5.1\ \Omega$, $V_{DS} = 750\ V$, $I_D = 100\ A$, $V_{GS} = -3/18\ V$



反偏安全工作区（RBSOA）, MOSFET, T1 / T2

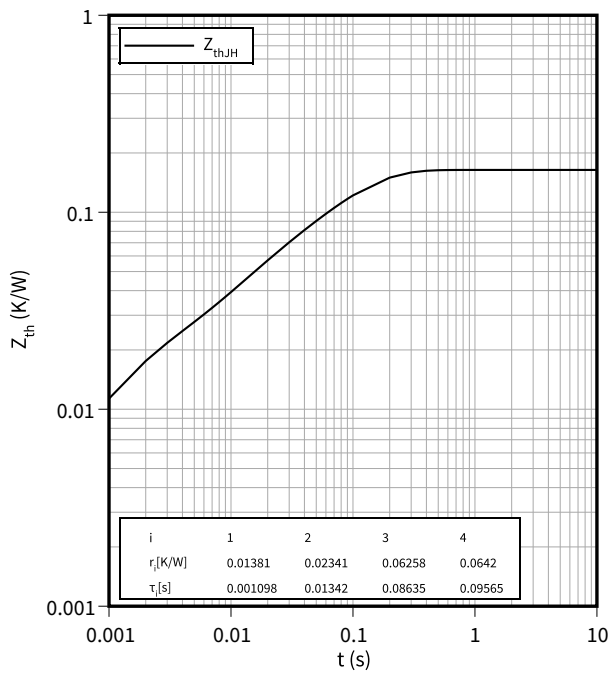
$I_D = f(V_{DS})$

$R_{Goff} = 0.51\ \Omega$, $T_{vj} = 175\ ^\circ C$, $V_{GS} = -3/18\ V$



瞬态热阻抗, MOSFET, T1 / T2

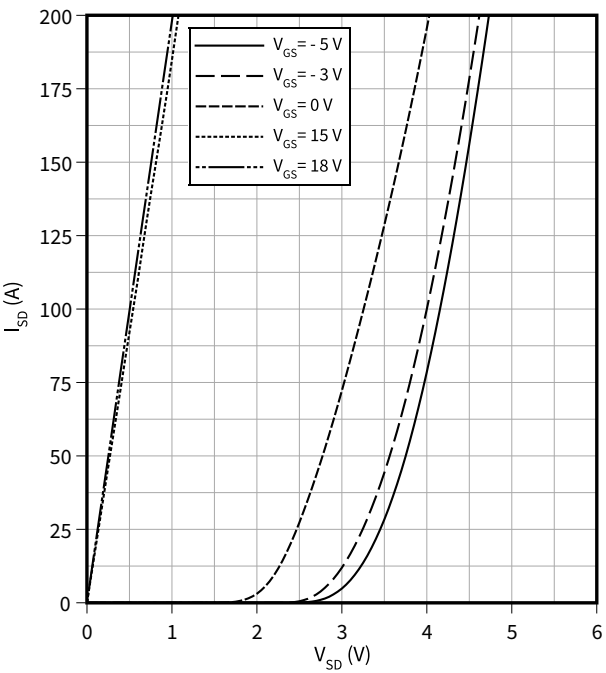
$Z_{th} = f(t)$



正向特性 体二极管（典型）, MOSFET, T1 / T2

$I_{SD} = f(V_{SD})$

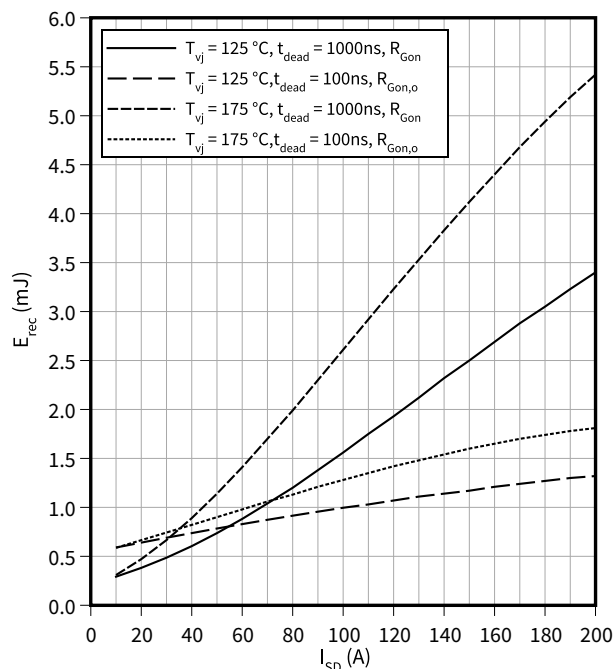
$T_{vj} = 25\ ^\circ C$



开关损耗 体二极管 (典型), MOSFET, T1 / T2

$$E_{\text{rec}} = f(I_{\text{SD}})$$

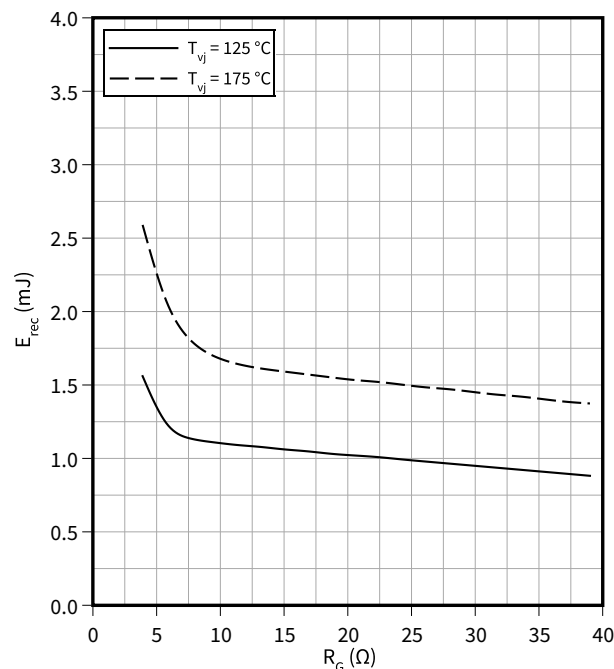
$$R_{\text{Gon}} = 3.9 \, \Omega, R_{\text{Gon,o}} = 0.51 \, \Omega, V_{\text{DD}} = 750 \, \text{V}$$



开关损耗 体二极管 (典型), MOSFET, T1 / T2

$$E_{\text{rec}} = f(R_{\text{G}})$$

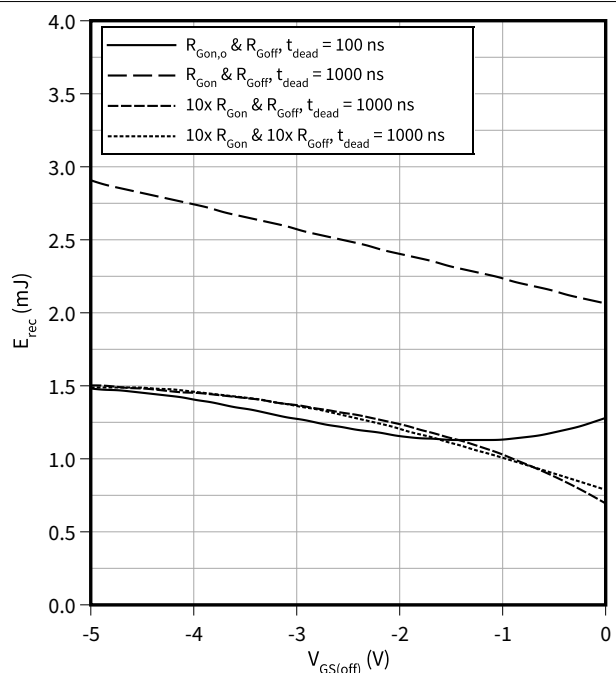
$$t_{\text{dead}} = 1000 \, \text{ns}, V_{\text{DD}} = 750 \, \text{V}, I_{\text{SD}} = 100 \, \text{A}$$



开关损耗 体二极管 (典型), MOSFET, T1 / T2

$$E_{\text{rec}} = f(V_{\text{GS(off)}})$$

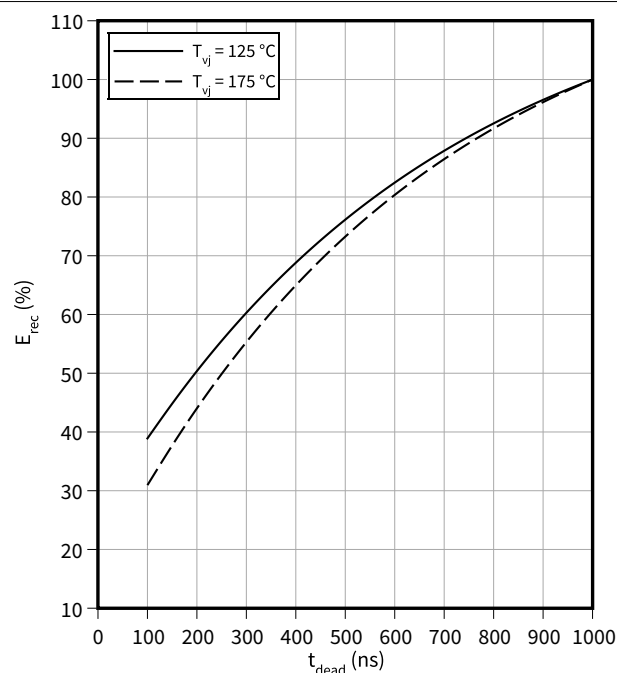
$$R_{\text{Goff}} = 2.4 \, \Omega, R_{\text{Gon}} = 3.9 \, \Omega, V_{\text{GS(on)}} = 18 \, \text{V}, I_{\text{SD}} = 100 \, \text{A}, R_{\text{Gon,o}} = 0.51 \, \Omega, V_{\text{DD}} = 750 \, \text{V}, T_{\text{vj}} = 175 \, ^\circ\text{C}$$



开关损耗 (典型), MOSFET, T1 / T2

$$E_{\text{rec}} = f(t_{\text{dead}})$$

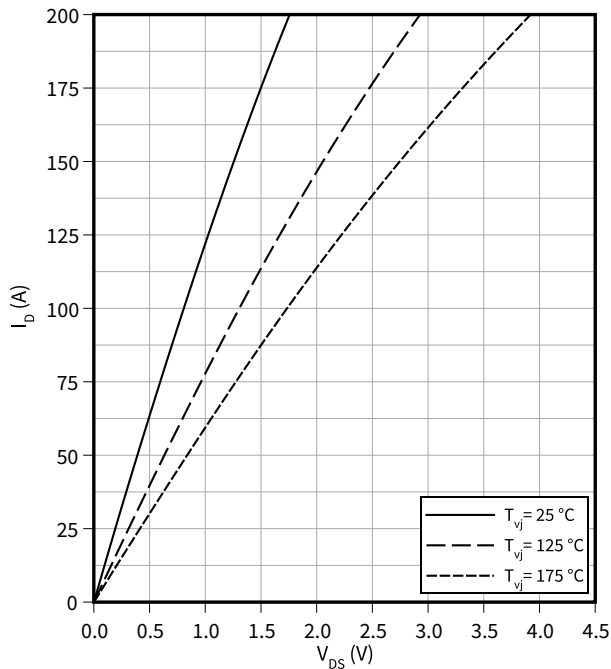
$$R_{\text{Gon}} = 3.9 \, \Omega, V_{\text{DS}} = 750 \, \text{V}, I_{\text{D}} = 100 \, \text{A}, V_{\text{GS}} = -3/18 \, \text{V}$$



7 特征参数图表

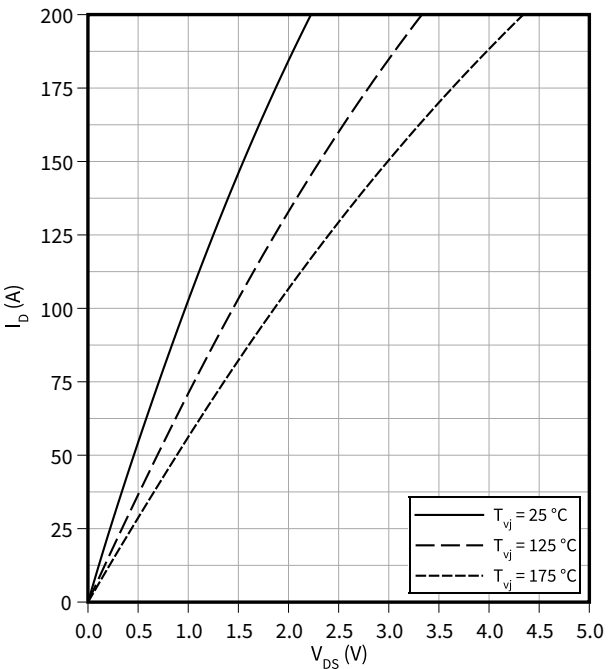
输出特性（典型）, MOSFET, T3 / T4

$I_D = f(V_{DS})$
 $V_{GS} = 18\text{ V}$



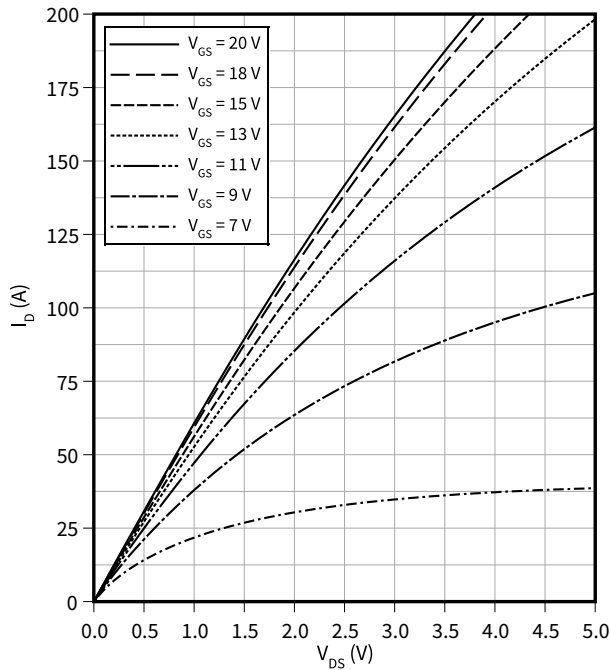
输出特性（典型）, MOSFET, T3 / T4

$I_D = f(V_{DS})$
 $V_{GS} = 15\text{ V}$



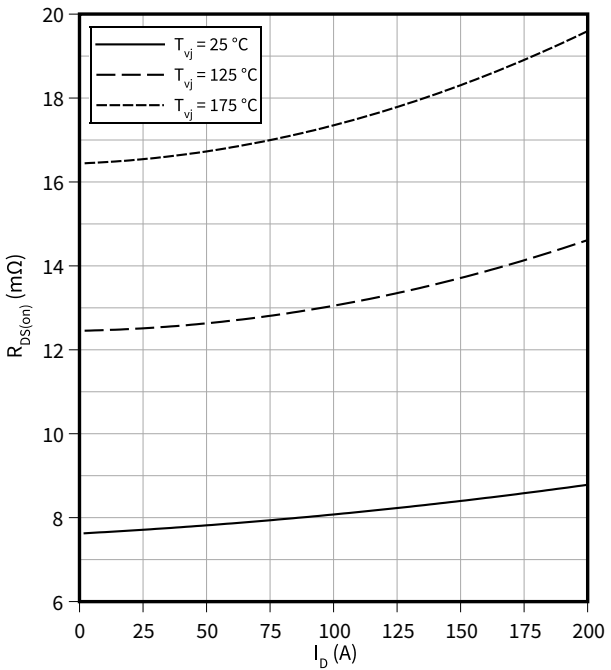
输出特性（典型）, MOSFET, T3 / T4

$I_D = f(V_{DS})$
 $T_{vj} = 175\text{ °C}$



漏源通态电阻（典型）, MOSFET, T3 / T4

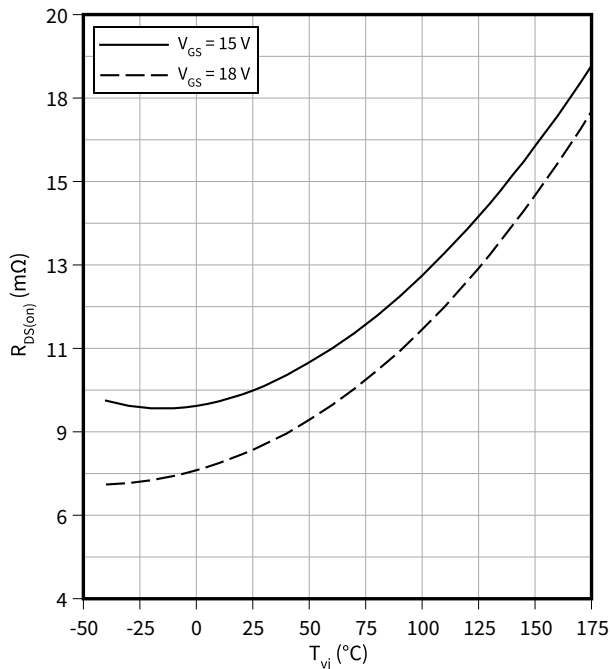
$R_{DS(on)} = f(I_D)$
 $V_{GS} = 18\text{ V}$



7 特征参数图表

漏源通态电阻（典型）, MOSFET, T3 / T4

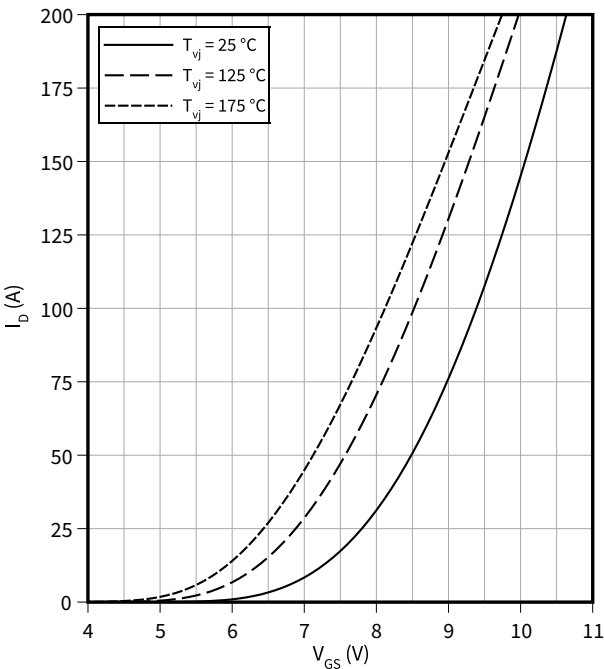
$R_{DS(on)} = f(T_{vj})$



传输特性（典型）, MOSFET, T3 / T4

$I_D = f(V_{GS})$

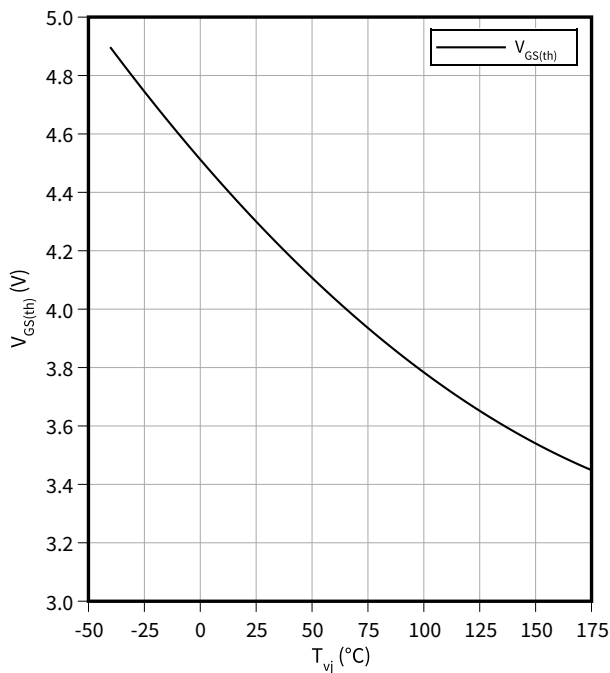
$V_{DS} = 20$ V



栅-源阈值电压（典型）, MOSFET, T3 / T4

$V_{GS(th)} = f(T_{vj})$

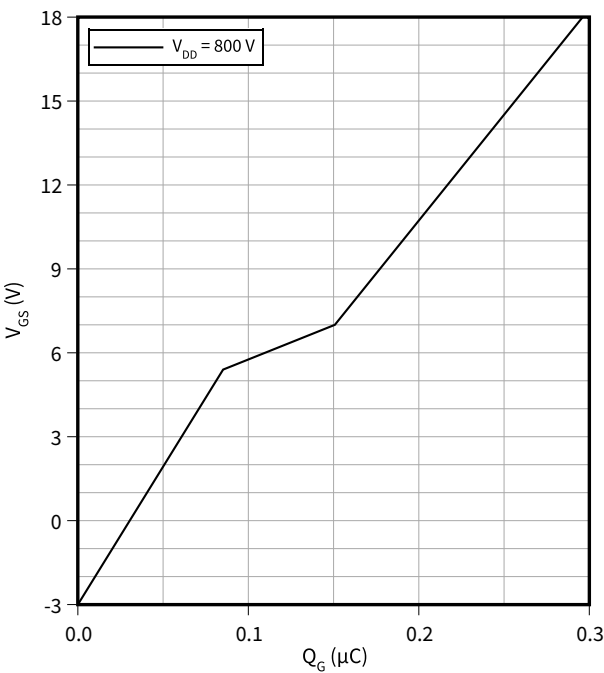
$I_D = 40$ mA, $V_{GS} = V_{DS}$



栅极电荷特性（典型）, MOSFET, T3 / T4

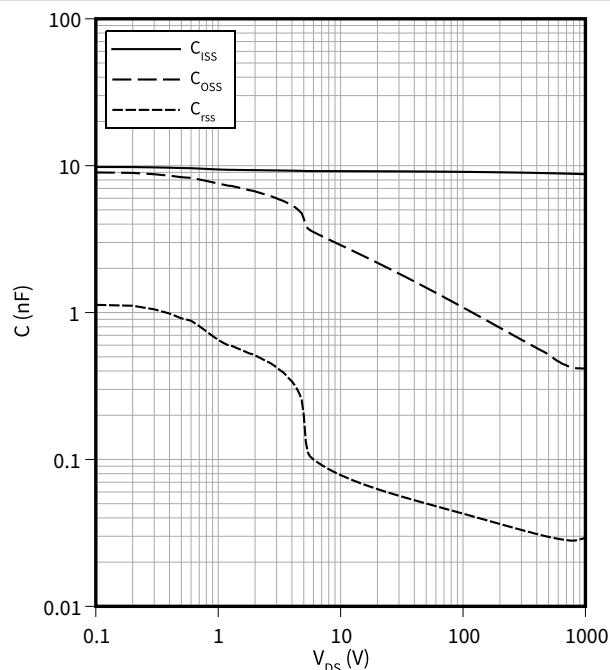
$V_{GS} = f(Q_G)$

$I_D = 100$ A, $T_{vj} = 25$ °C



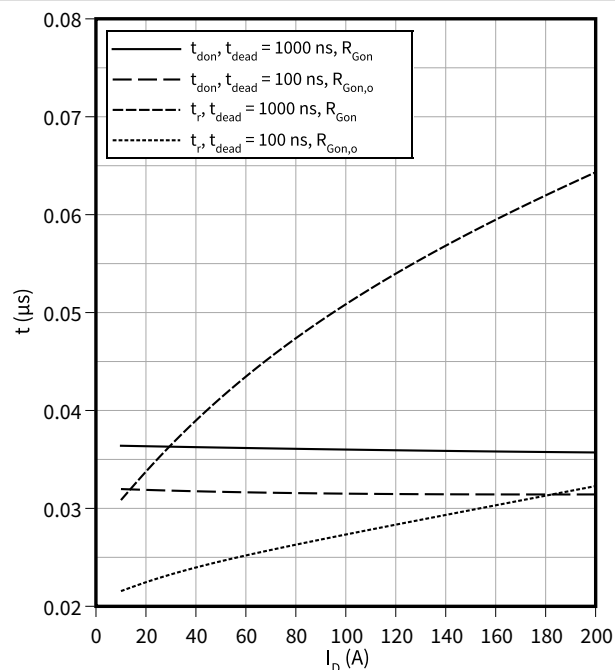
电容特性 (典型), MOSFET, T3 / T4

$$C = f(V_{DS})$$

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


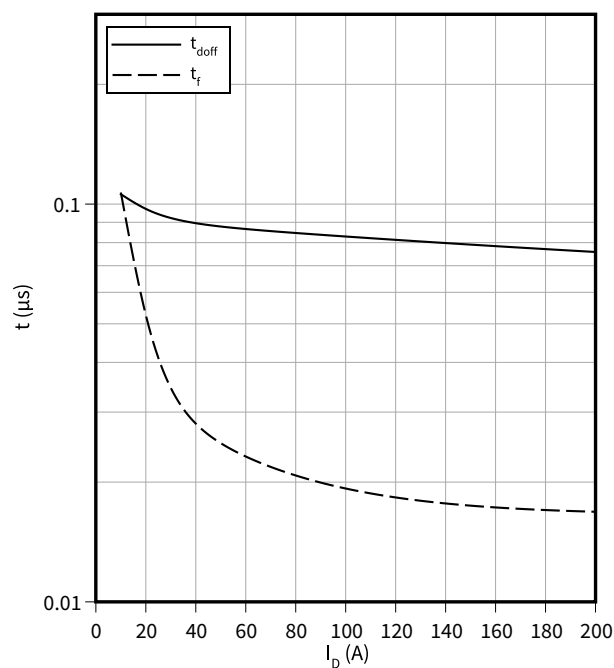
开关时间 (典型), MOSFET, T3 / T4

$$t = f(I_D)$$

 $V_{DD} = 750 \text{ V}, R_{Gon} = 3.9 \Omega, R_{Gon,o} = 0.51 \Omega, T_{vj} = 175^\circ\text{C}, V_{GS} = -3/18 \text{ V}$


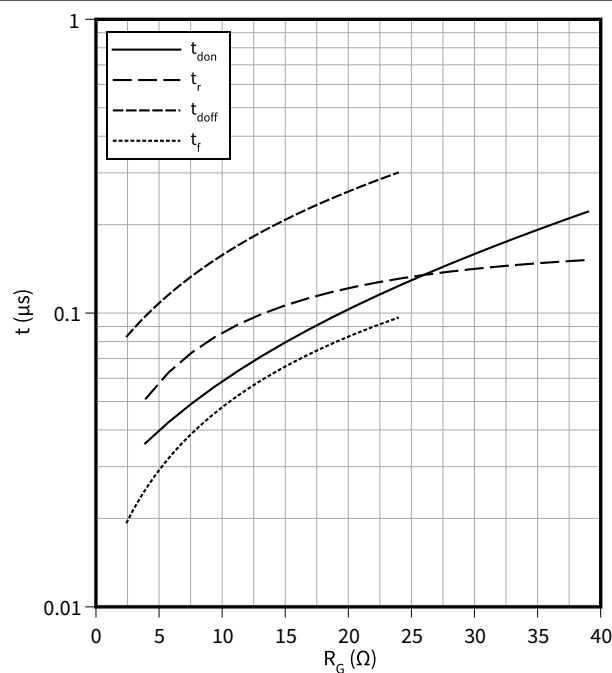
开关时间 (典型), MOSFET, T3 / T4

$$t = f(I_D)$$

 $R_{Goff} = 2.4 \Omega, V_{DD} = 750 \text{ V}, T_{vj} = 175^\circ\text{C}, V_{GS} = -3/18 \text{ V}$


开关时间 (典型), MOSFET, T3 / T4

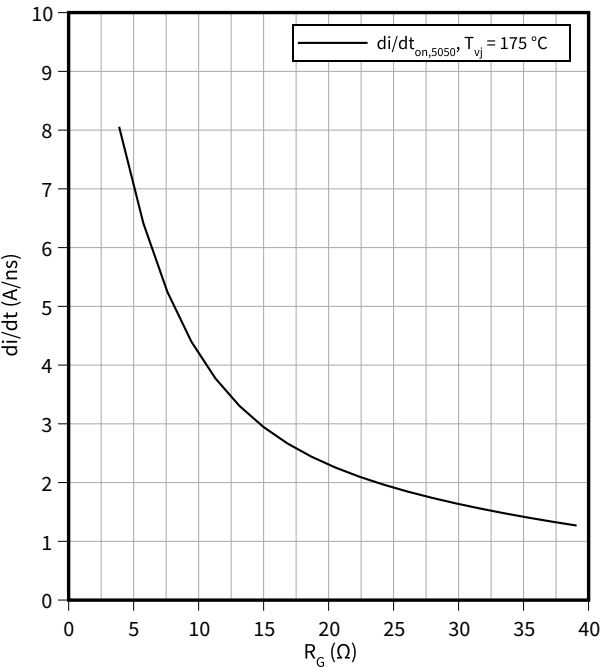
$$t = f(R_G)$$

 $V_{DD} = 750 \text{ V}, t_{dead} = 1000 \text{ ns}, I_D = 100 \text{ A}, T_{vj} = 175^\circ\text{C}, V_{GS} = -3/18 \text{ V}$


电流变化斜率（典型）, MOSFET, T3 / T4

$di/dt = f(R_G)$

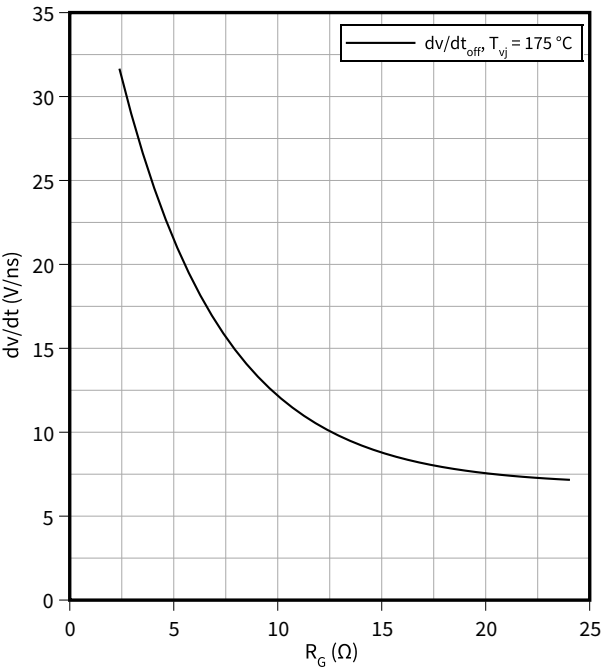
$V_{DD} = 750\text{ V}$, $t_{dead} = 1000\text{ ns}$, $I_D = 100\text{ A}$, $V_{GS} = -3/18\text{ V}$



电压变化斜率（典型）, MOSFET, T3 / T4

$dv/dt = f(R_G)$

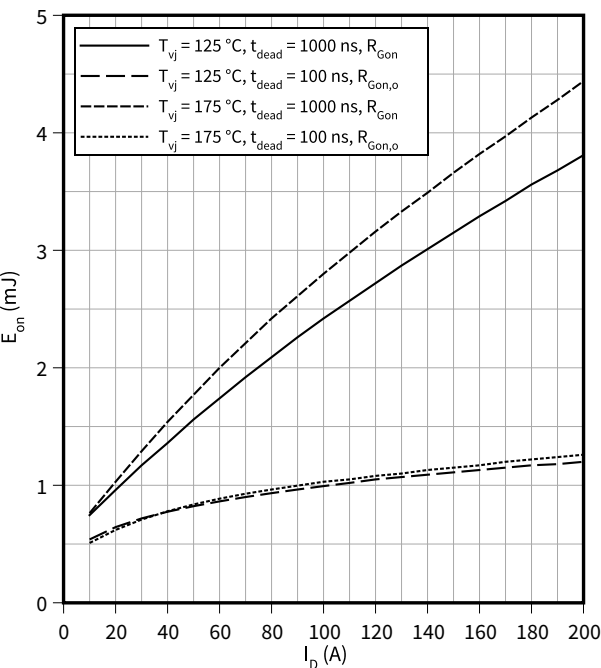
$V_{DD} = 750\text{ V}$, $I_D = 100\text{ A}$, $V_{GS} = -3/18\text{ V}$



开关损耗（典型）, MOSFET, T3 / T4

$E_{on} = f(I_D)$

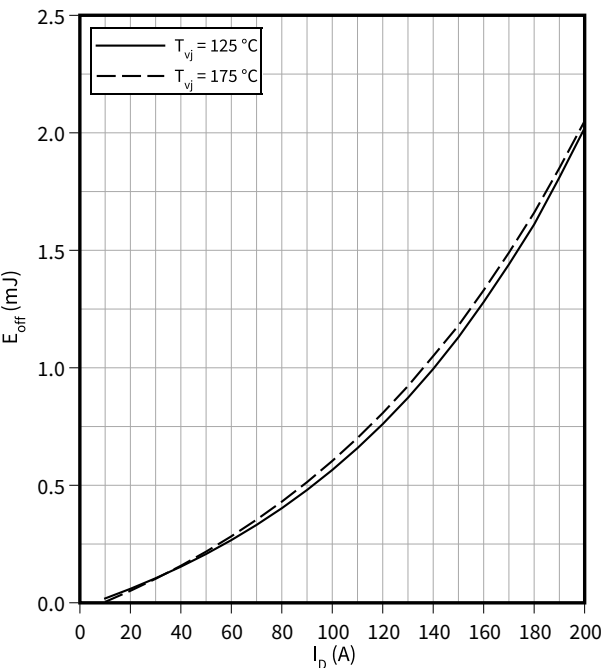
$V_{DD} = 750\text{ V}$, $R_{Gon} = 3.9\text{ Ω}$, $R_{Gon,o} = 0.51\text{ Ω}$, $V_{GS} = -3/18\text{ V}$



开关损耗（典型）, MOSFET, T3 / T4

$E_{off} = f(I_D)$

$R_{Goff} = 2.4\text{ Ω}$, $V_{DD} = 750\text{ V}$, $V_{GS} = -3/18\text{ V}$

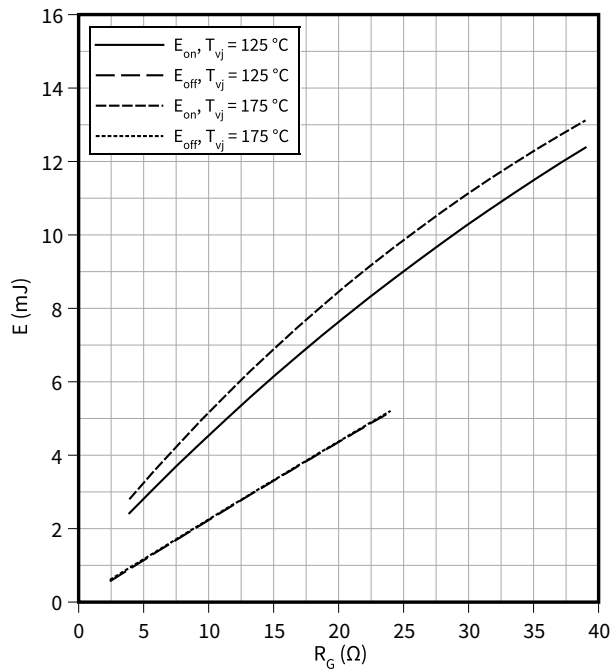


7 特征参数图表

开关损耗（典型）, MOSFET, T3 / T4

$E = f(R_G)$

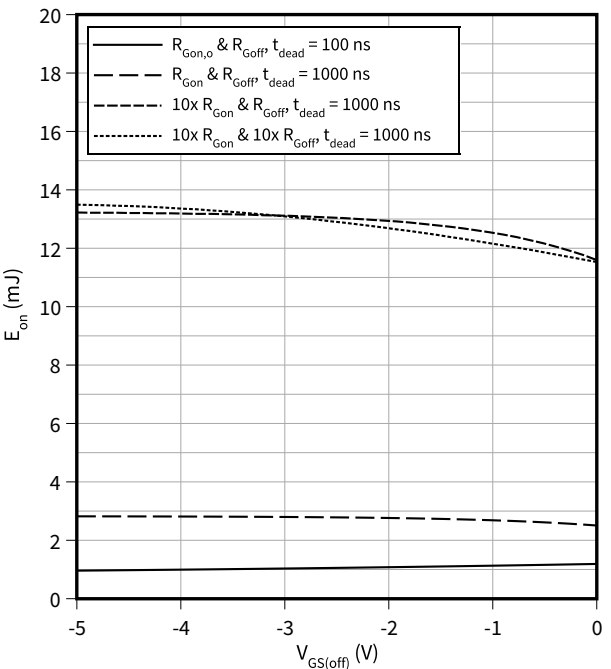
$V_{DD} = 750\text{ V}$, $t_{\text{dead}} = 1000\text{ ns}$, $I_D = 100\text{ A}$, $V_{GS} = -3/18\text{ V}$



开关损耗（典型）, MOSFET, T3 / T4

$E_{\text{on}} = f(V_{GS(\text{off})})$

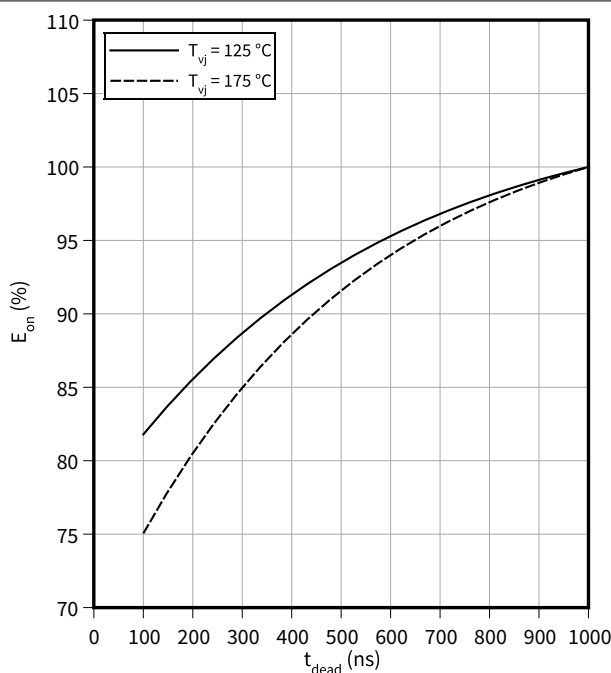
$V_{DD} = 750\text{ V}$, $V_{GS(\text{on})} = 18\text{ V}$, $I_D = 100\text{ A}$, $T_{vj} = 175\text{ °C}$



开关损耗（典型）, MOSFET, T3 / T4

$E_{\text{on}} = f(t_{\text{dead}})$

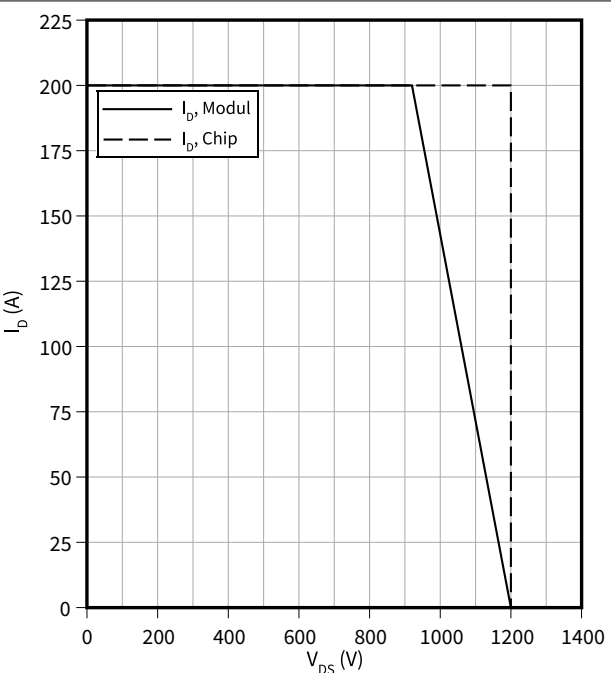
$R_{Gon} = 3.9\text{ }\Omega$, $I_D = 100\text{ A}$, $V_{DD} = 750\text{ V}$, $V_{GS} = -3/18\text{ V}$



Reverse bias safe operating area (RBSOA), MOSFET, T3 / T4

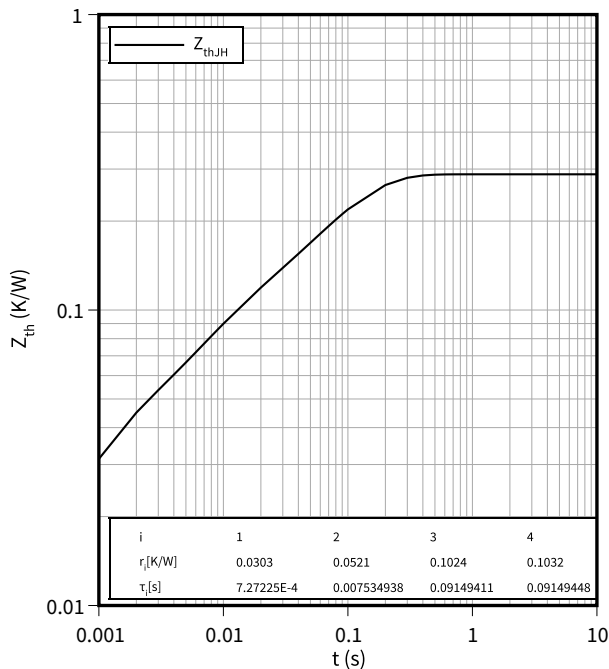
$I_D = f(V_{DS})$

$R_{Goff} = 2.4\text{ }\Omega$, $T_{vj} = 175\text{ °C}$, $V_{GS} = -3/18\text{ V}$



瞬态热阻抗, MOSFET, T3 / T4

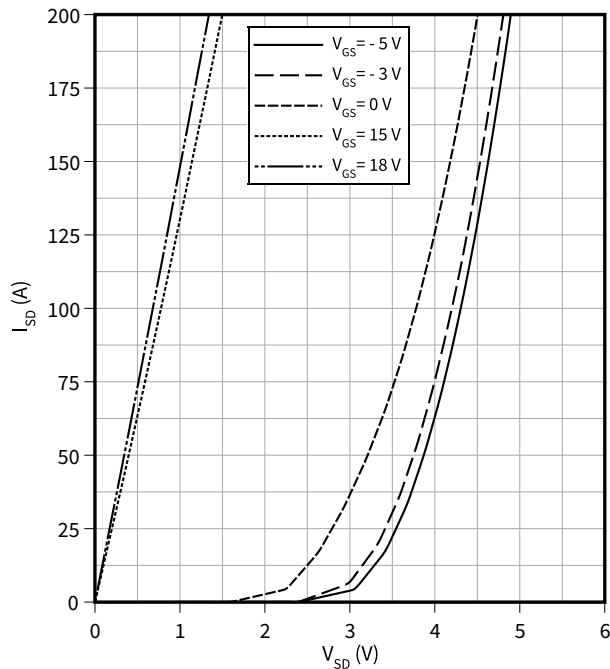
$Z_{th} = f(t)$



正向特性 体二极管 (典型), MOSFET, T3 / T4

$I_{SD} = f(V_{SD})$

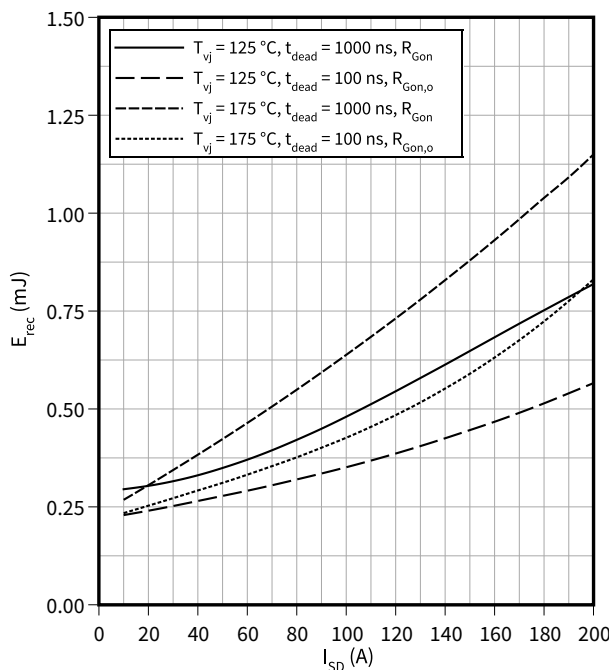
$T_{vj} = 25\text{ }^{\circ}\text{C}$



开关损耗 体二极管 (典型), MOSFET, T3 / T4

$E_{rec} = f(I_{SD})$

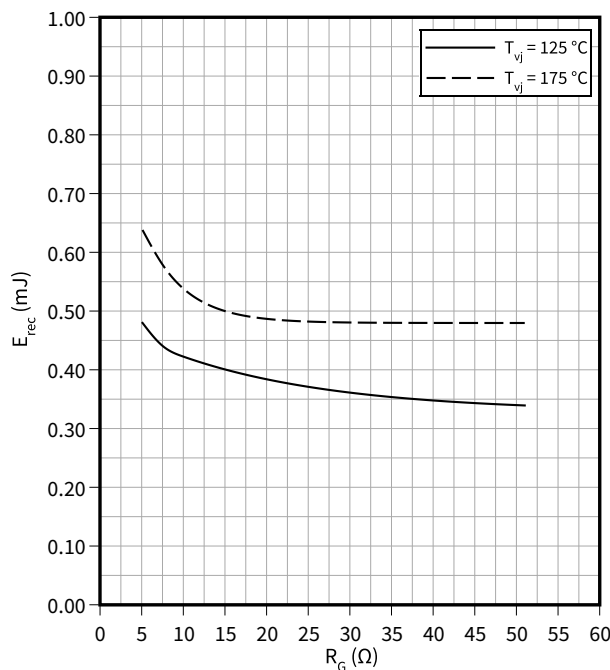
$R_{Gon} = 5.1\text{ }\Omega$, $R_{Gon,o} = 3\text{ }\Omega$, $V_{DD} = 750\text{ V}$



开关损耗 体二极管 (典型), MOSFET, T3 / T4

$E_{rec} = f(R_G)$

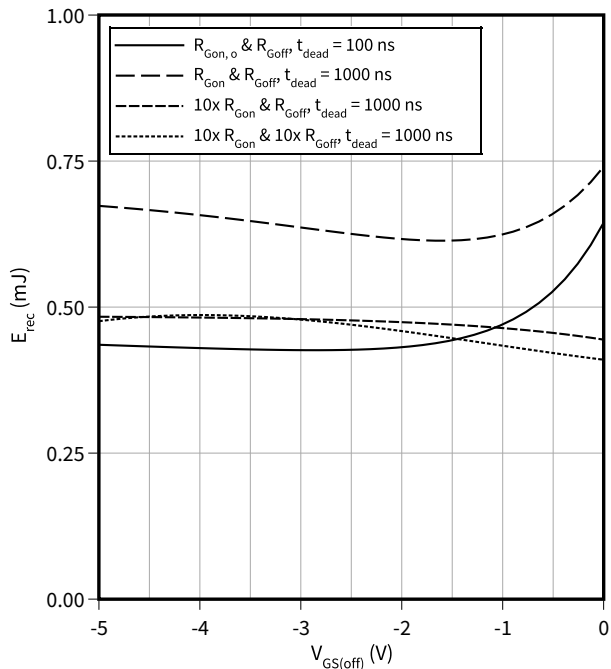
$t_{dead} = 1000\text{ ns}$, $I_{SD} = 100\text{ A}$, $V_{DD} = 750\text{ V}$



7 特征参数图表

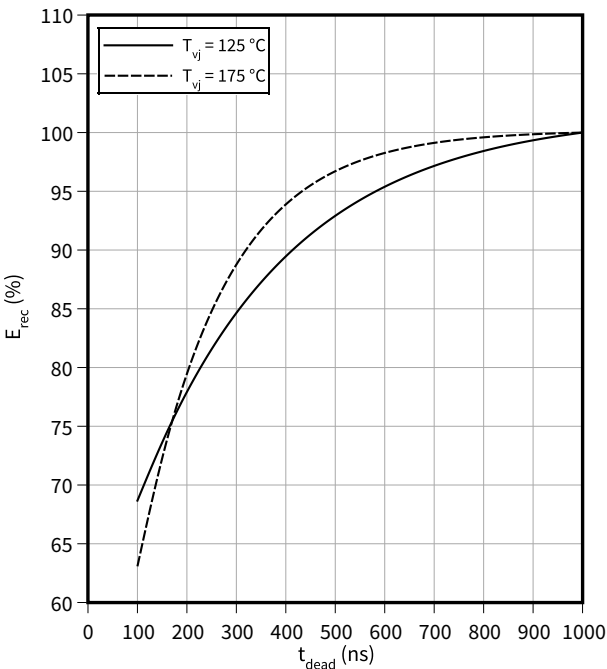
开关损耗 体二极管（典型）, MOSFET, T3 / T4

$E_{rec} = f(V_{GS(off)})$
 $R_{Goff} = 0.51 \Omega$, $R_{Gon} = 5.1 \Omega$, $V_{GS(on)} = 18 \text{ V}$, $I_{SD} = 100 \text{ A}$,
 $R_{Gon,o} = 3 \Omega$, $V_{DD} = 750 \text{ V}$, $T_{vj} = 175 \text{ }^{\circ}\text{C}$



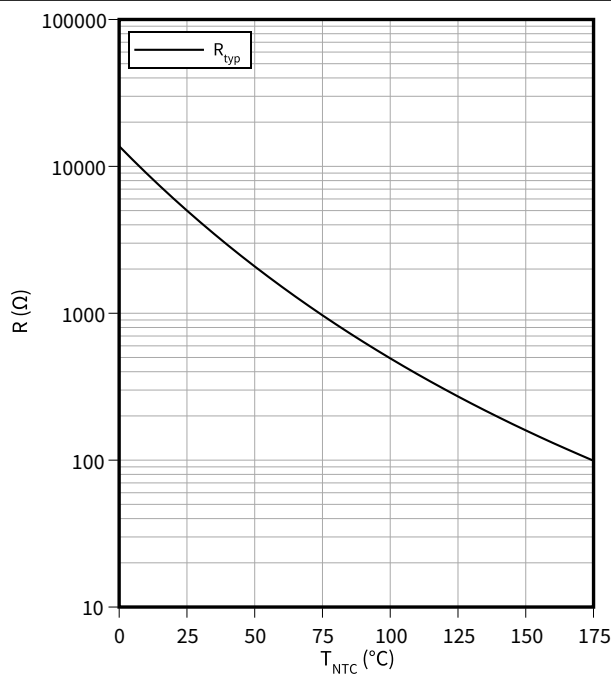
开关损耗 体二极管（典型）, MOSFET, T3 / T4

$E_{rec} = f(t_{dead})$
 $R_{Gon} = 5.1 \Omega$, $I_D = 100 \text{ A}$, $V_{DD} = 750 \text{ V}$, $V_{GS} = -3/18 \text{ V}$



温度特性, 负温度系数热敏电阻

$R = f(T_{NTC})$



8 电路拓扑图

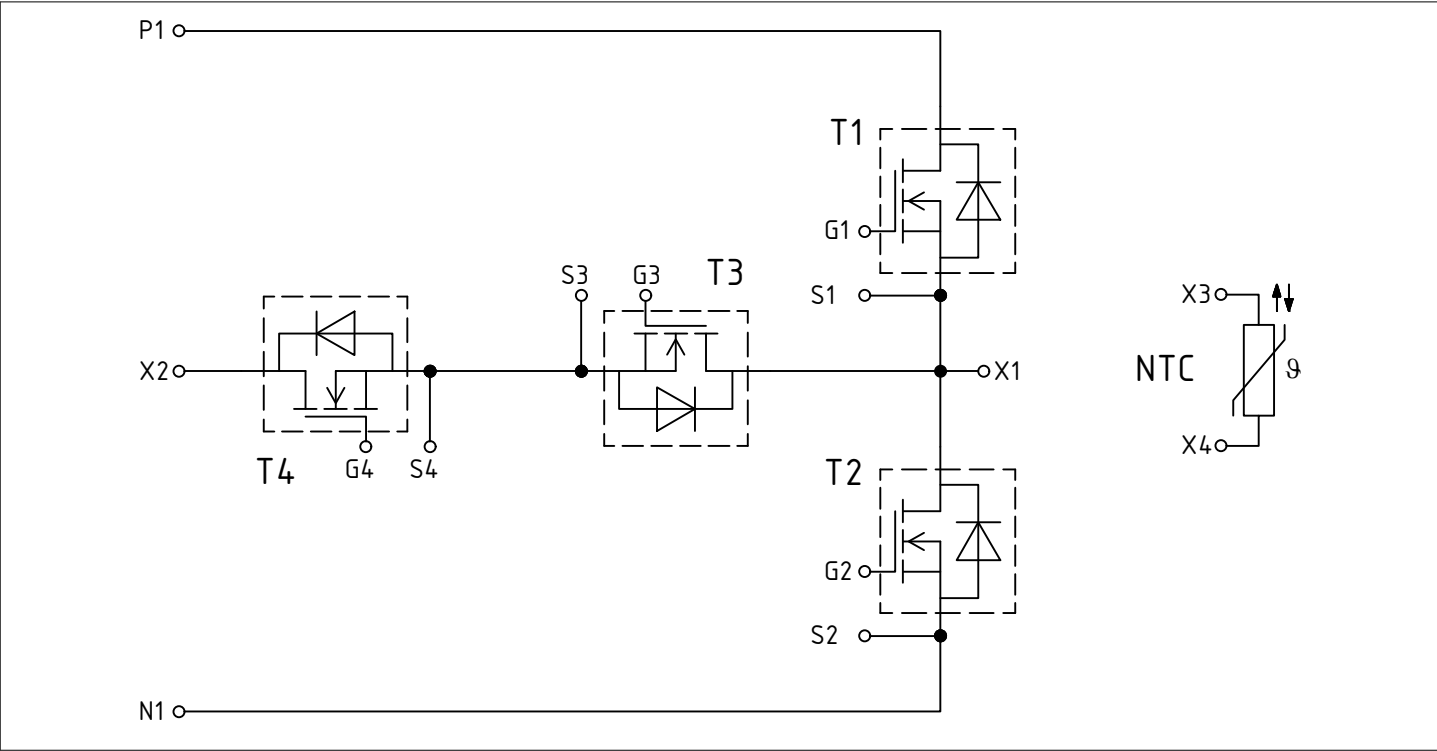


图 1

9 封装尺寸

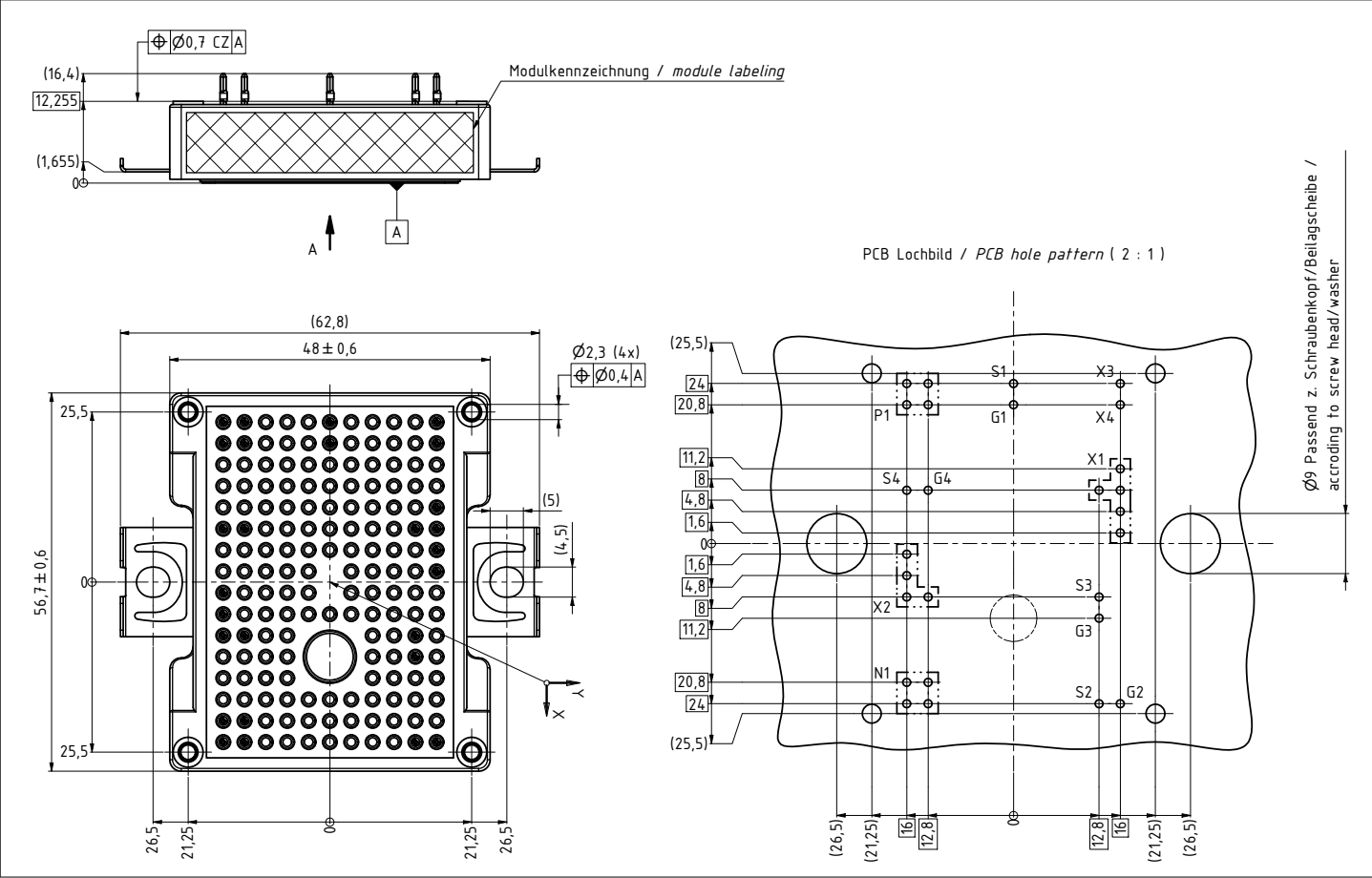


图 2

10 模块标签代码

Module label code			
Code format	Data Matrix		Barcode Code128
Encoding	ASCII text		Code Set A
Symbol size	16x16		23 digits
Standard	IEC24720 and IEC16022		IEC8859-1
Code content	Content	Digit	Example
	Module serial number	1 -5	71549
	Module material number	6 - 11	142846
	Production order number	12 - 19	55054991
	Date code (production year)	20 -21	15
	Date code (production week)	22 -23	30
Example			
			
71549142846550549911530		71549142846550549911530	

图 3



修订历史

修订历史

修订版本	发布日期	变更说明
0.10	2024-03-18	Initial version
1.00	2024-08-23	Final datasheet
1.10	2024-10-17	Final datasheet
1.20	2025-03-05	Final datasheet

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