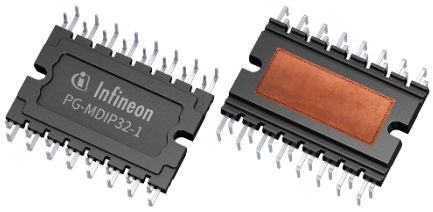
CIPOS™ Prime

AMM12S25LB1Z



Features

- 1200 V SiC MOSFET 6-pack
- 25 mΩ of typical $R_{DS(on)}$ at V_{GS} = 18 V, T_J = 25°C
- Maximum operating T_J = 175°C
- Very low switching losses
- Robust against parasitic turn on, 0 V turn-off gate voltage can be applied
- Robust body diode for hard commutation
- High performance AlN DCB substrate
- Integrated NTC thermistor

Potential applications

- On-board charger
- DC-DC converter
- EV charging
- Power conversion AC-DC, DC-AC

Product validation

Qualified for automotive applications

Product validation according to AEC-Q101 / 200 and AQG 324

Description

The CIPOS™ Prime product offers an integrated solution for high frequency power conversion applications. The power module includes six SiC MOSFETs and a NTC and enables high power density. Infineon's SiC technology provides excellent switching performance, wide range of gate-source voltage, and benchmark gate threshold voltage. The DCB substrate enables optimal thermal performance and package is designed to ensure a high creepage distance.

Table 1 Product Information

Base Part Number	Package Type	Standard Pack		Sales Product Number
		Form	MOQ	
AMM12S25LB1Z	DIP 44x28DA	11 pcs / Tube	176 pcs	SP006043500

Table of contents

1 MOSFET

Table 2 Maximum ratings

Description	Symbol	Condition	Values	Unit
Drain-source voltage	V_{DSS}	$T_J \geq 25°C$	1200	V
Continuous drain current for $R_{th(j-c)}$, limited by $T_{J.max}$	I_D	V_{GS} = 18 V, T_C = 25°C	64	A
		V_{GS} = 18 V, T_C = 100°C	45	
Peak drain current, t_p limited by $T_{J.max}$	I_{DM}	V_{GS} = 18 V	135	A
Gate-source voltage, max. transient voltage	V_{GS}	$t_p \leq 0.5$ µs, D < 0.01	-10 ~ 23	V
Gate-source voltage, max. static voltage	V_{GS}		-5 ~ 20	V
Power dissipation per switch	P_D		245	W
Operating junction temperature	T_J		-40 ~ 175	°C

Table 3 Recommended values

Description	Symbol	Condition	Values	Unit
Turn-on gate-source voltage	$V_{GS(on)}$		15 ~ 18	V
Turn-off gate-source voltage	$V_{GS(off)}$		-3 ~ 0	V

Table 4 Electrical characteristics

(T_J = 25°C if not stated otherwise)

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Drain-source on-state resistance	$R_{DS(on)}$	I_D = 27.3 A, V_{GS} = 18 V		25	35.3	mΩ
		I_D = 27.3 A, V_{GS} = 18 V, T_J = 175°C		60		
		I_D = 27.3 A, V_{GS} = 15 V		31		
Gate-source threshold voltage	$V_{GS(th)}$	I_D = 8.6 mA, V_{DS} = V_{GS}	3.5	4.2	5.1	V
		I_D = 8.6 mA, V_{DS} = V_{GS}, T_J = 175°C		3.2		
Zero gate-voltage drain current	I_{DSS}	V_{DS} = 1200 V, V_{GS} = 0 V			195	µA
		V_{DS} = 1200 V, V_{GS} = 0 V, T_J = 175°C		4.2		
Gate leakage current	I_{GSS}	V_{DS} = 0 V, V_{GS} = 23 V			120	nA
		V_{DS} = 0 V, V_{GS} = -10 V			-120	
Forward transconductance	g_{fs}	I_D = 27.3 A, V_{DS} = 20 V		13.2		S

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Internal gate resistance	$R_{G,int}$	f = 1 MHz, V_{AC} = 25 mV		7.5		Ω
Input capacitance	C_{iss}	V_{DS} = 800 V, V_{GS} = 0 V, f = 100 kHz, V_{AC} = 25 mV		1986		pF
Output capacitance	C_{oss}			92		
Reverse transfer capacitance	C_{rss}			9.4		
C_{oss} stored energy	E_{oss}			38		µJ
Total gate charge	Q_G	V_{DS} = 800 V, I_D = 27.3 A, V_{GS} = 0 to 18 V		60		nC
Plateau gate charge	$Q_{GS(pl)}$			22		
Gate-to-drain charge	Q_{GD}			17		
Turn-on energy	E_{on}	V_{DS} = 800 V, I_D = 27.3 A, V_{GS} = 0 to 18 V, R_G = 5 Ω		215		µJ
		V_{DS} = 800 V, I_D = 27.3 A, V_{GS} = 0 to 18 V, R_G = 5 Ω, T_J = 175°C		240		
Turn-off energy	E_{off}	V_{DS} = 800 V, I_D = 27.3 A, V_{GS} = 0 to 18 V, R_G = 5 Ω		210		µJ
		V_{DS} = 800 V, I_D = 27.3 A, V_{GS} = 0 to 18 V, R_G = 5 Ω, T_J = 175°C		235		

2 MOSFET body diode

Table 5 Maximum ratings

Description	Symbol	Condition	Values	Unit
Drain-source voltage	V_{DSS}	$T_J \geq 25°C$	1200	V
Peak reverse drain current, t_p limited by $T_{J.max}$	I_{SM}	$V_{GS} = 0$ V	62	A

Table 6 Electrical characteristics

($T_J = 25°C$ if not stated otherwise)

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Drain-source reverse voltage	V_{SD}	$I_{SD} = 27.3$ A, $V_{GS} = 0$ V		4.2	5.5	V
		$I_{SD} = 27.3$ A, $V_{GS} = 0$ V, $T_J = 175°C$		4.05		
MOSFET reverse recovery charge	Q_{rr}	$V_{DS} = 800$ V, $I_{SD} = 27.3$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C		0.43		µC
		$V_{DS} = 800$ V, $I_{SD} = 27.3$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C, $T_J = 175°C$		0.53		
MOSFET peak reverse recovery current	I_{rrm}	$V_{DS} = 800$ V, $I_{SD} = 27.3$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C		25		A
		$V_{DS} = 800$ V, $I_{SD} = 27.3$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C, $T_J = 175°C$		29.7		
MOSFET reverse recovery energy	E_{rr}	$V_{DS} = 800$ V, $I_{SD} = 27.3$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C		170		µJ
		$V_{DS} = 800$ V, $I_{SD} = 27.3$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C, $T_J = 175°C$		215		

3 Package

Table 7 Characteristics and ratings

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Storage temperature	T_{stg}		-40		125	°C
Thermal resistance, junction-case per switch	$R_{th(j-c)}$				0.61	K/W
Isolation voltage	V_{ISO}	1 min., RMS, f = 50 Hz	3.5			kV
Clearance distance		Pin to pin	2.4			mm
		Pin to flat heatsink	3.3			
Creepage distance		Pin to pin	5.5			
		Pin to DCB	12.12			
Comparative tracking index	CTI		600			V
Mounting torque		M3 SEMS screw	0.39	0.68	0.98	Nm
DCB flatness			0		120	µm
Weight				13.8		g

4 Thermistor

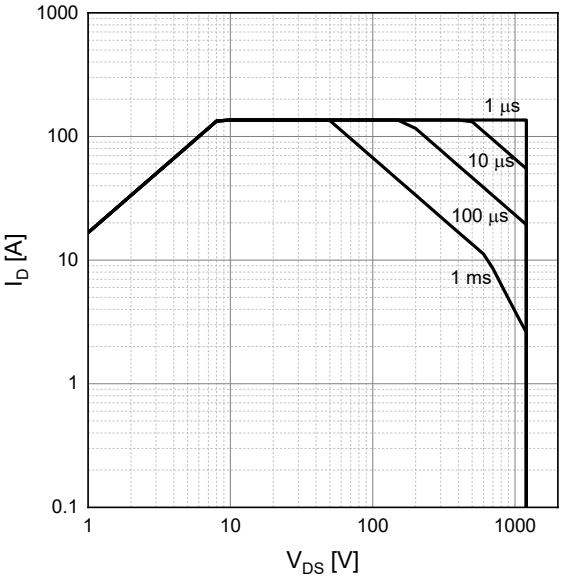
Table 8 Characteristic values

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Resistance	R_{25}	T = 25°C		10		kΩ
Tolerance			-2		2	%
Resistance	R_{100}	T = 100°C		674.4		Ω
Tolerance			-4.75		4.75	%
B-constant	B(25/50)	T = 25°C to 50°C		3946		K
	B(25/85)	T = 25°C to 85°C		3988		
	B(25/100)	T = 25°C to 100°C		4000		
Operating temperature range	T_{NTC}		-40		150	°C

5 Characteristics diagrams

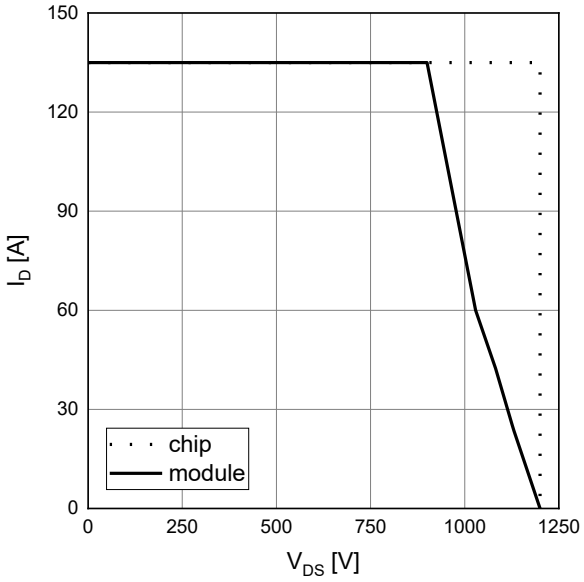
Forward bias safe operating area (FBSOA)

$I_D = f(V_{DS})$, $T_C = 25°C$, D = 0, parameter: t_p



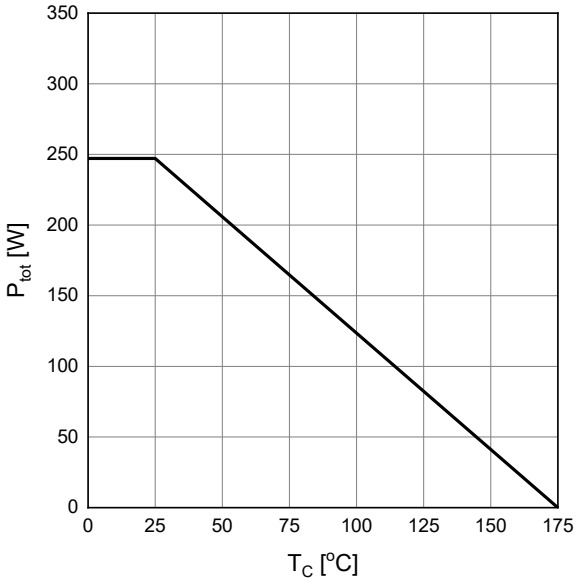
Reverse bias safe operating area (RBSOA)

$I_D = f(V_{DS})$, V_{GS} = 0/18 V, $T_J \leq 175°C$, $T_C = 25°C$



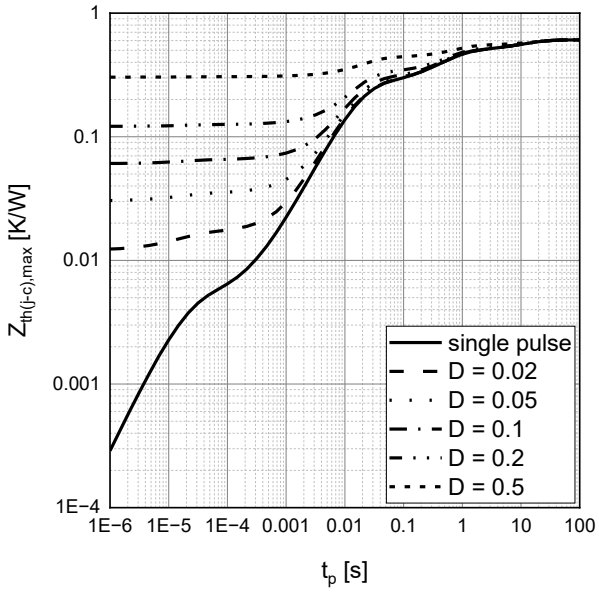
Power dissipation

$P_{tot} = f(T_C)$



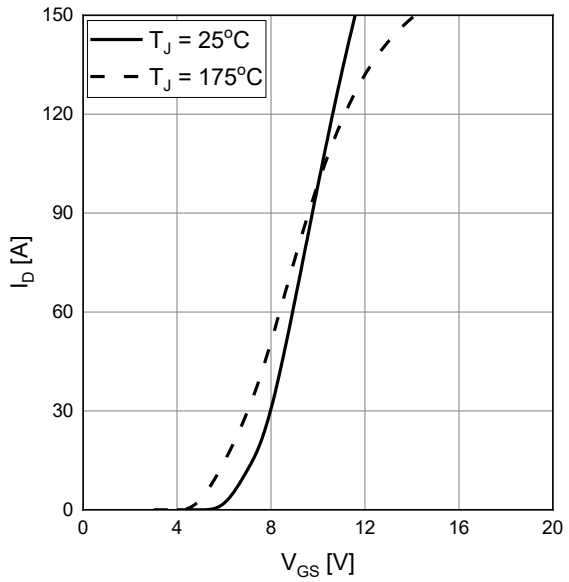
Max. transient thermal impedance

$Z_{th(j-c),max} = f(t_p)$, $D = t_p/T$



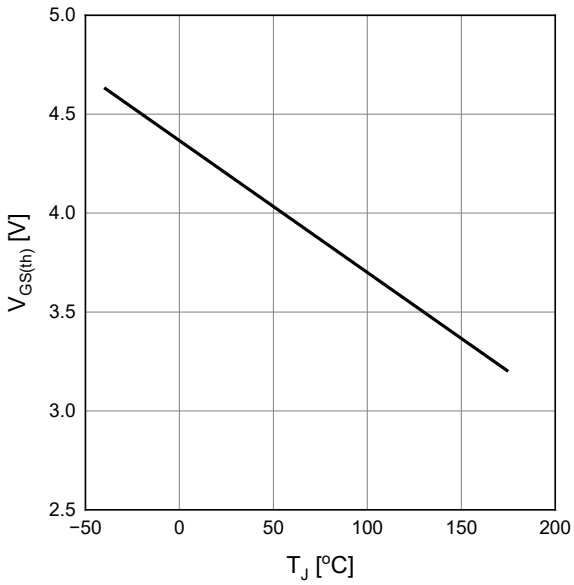
Typical transfer characteristics

$I_{DS} = f(V_{GS})$, V_{DS} = 20 V



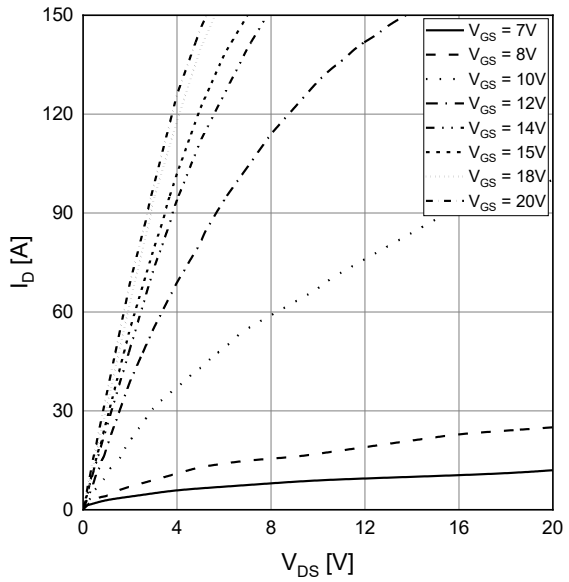
Typical gate-source threshold voltage vs junction temperature

$V_{GS(th)} = f(T_J)$, I_D = 8.6 mA



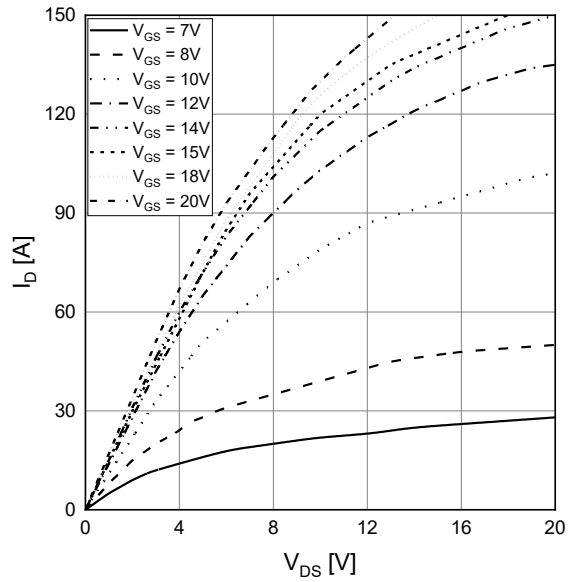
Typical output characteristics

$I_D = f(V_{DS})$, T_J = 25°C



Typical output characteristics

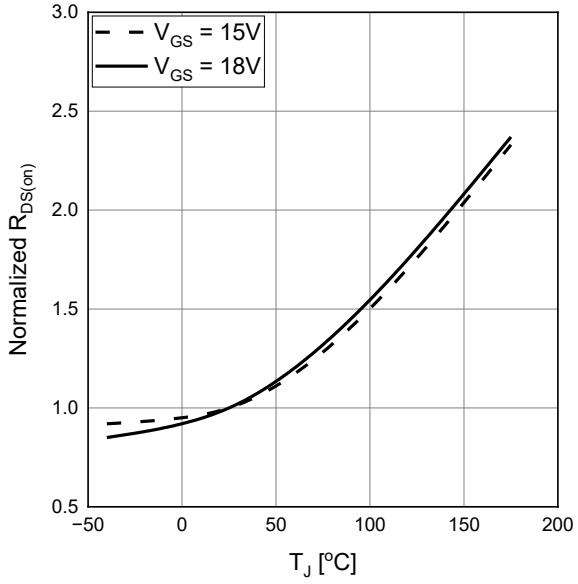
$I_D = f(V_{DS})$, T_J = 175°C



Characteristics diagrams

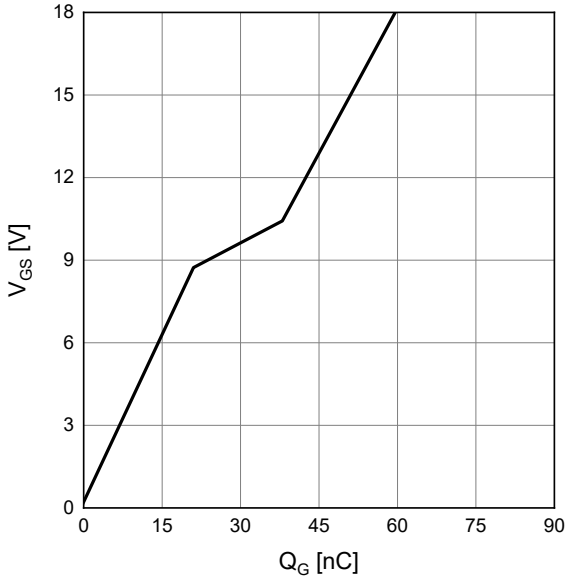
Typical on-state resistance vs junction temperature

$R_{DS(on)} = f(T_J)$, $I_D = 27.3$ A



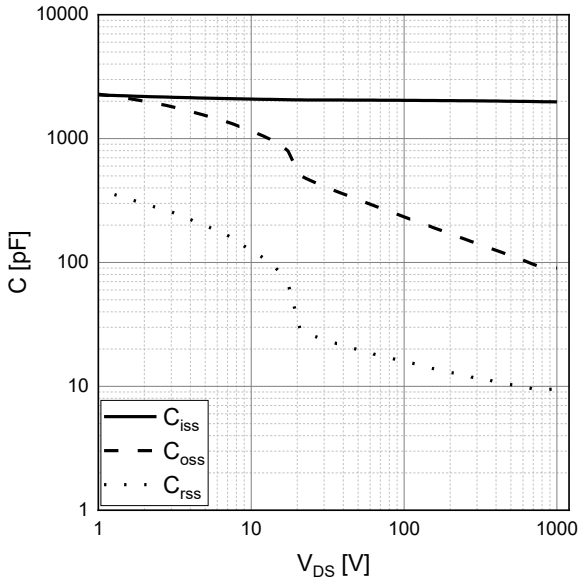
Typical gate charge

$V_{GS} = f(Q_G)$, $I_D = 27.3$ A, $V_{DS} = 800$ V



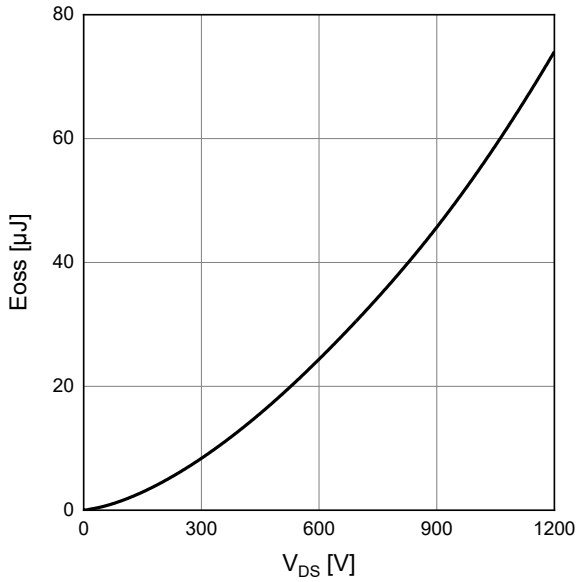
Typical capacitance vs drain-source voltage

$C = f(V_{DS})$, $f = 100$ kHz, $V_{GS} = 0$ V



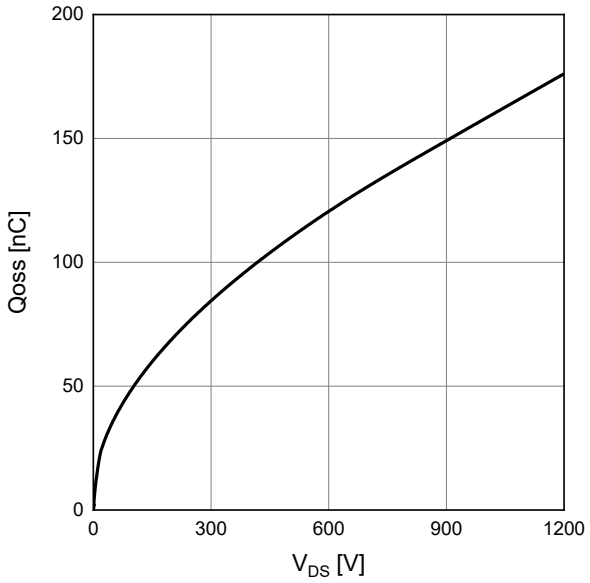
Typical Coss stored energy

$E = f(V_{DS})$



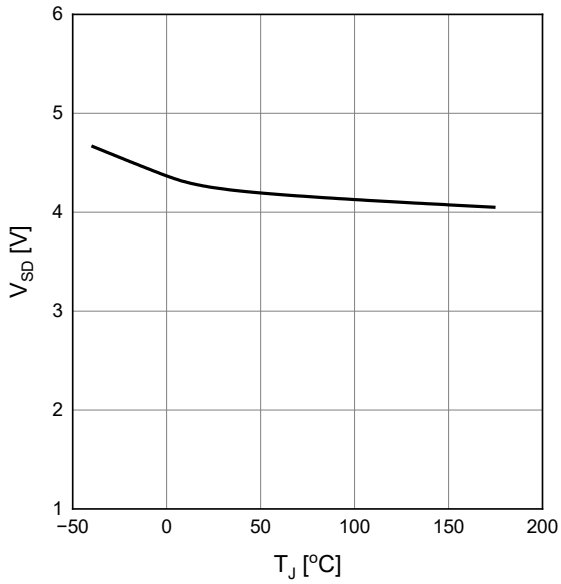
Typical Coss stored charge

$Q = f(V_{DS})$



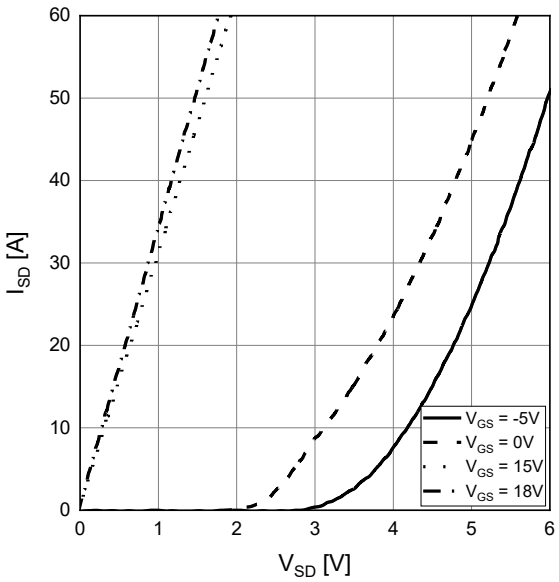
Typical reverse drain voltage characteristics

$V_{SD} = f(T_J)$, I_{SD} = 27.3 A, V_{GS} = 0 V



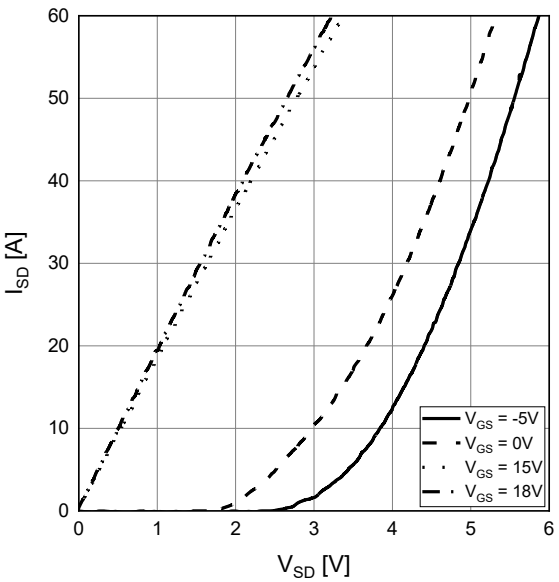
Typical reverse drain current characteristics

$I_{SD} = f(V_{SD})$, T_J = 25°C



Typical reverse drain current characteristics

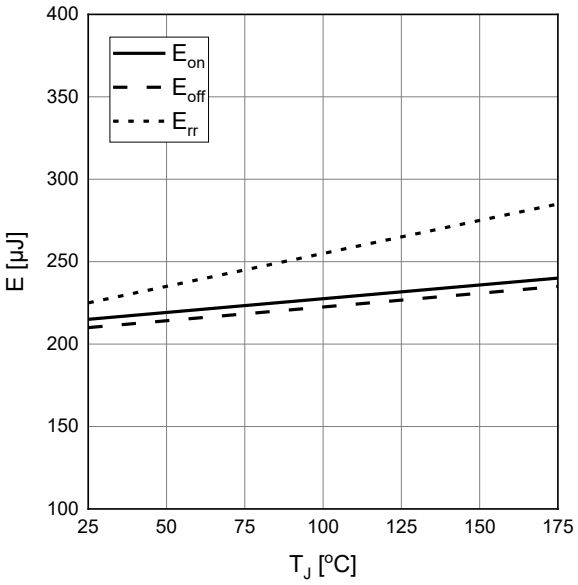
$I_{SD} = f(V_{SD})$, T_J = 175°C



Characteristics diagrams

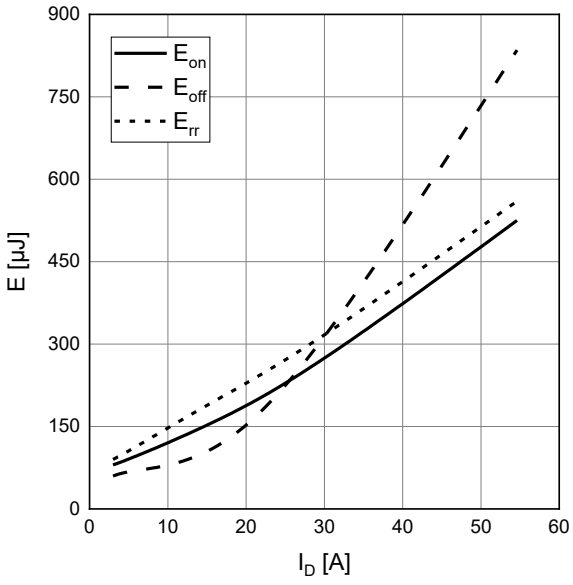
Typical switching losses vs junction temperature

$E = f(T_J)$, V_{GS} = 0/18 V, I_D = 27.3 A, $R_{G,ext}$ = 5 Ω, V_{DS} = 800 V



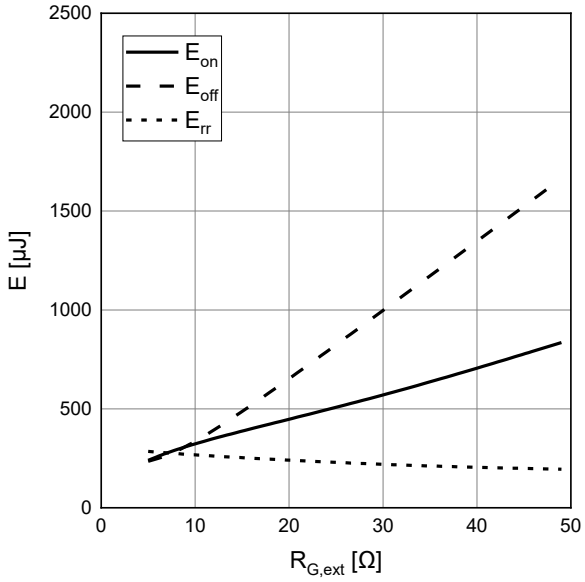
Typical switching losses vs drain current

$E = f(I_D)$, V_{GS} = 0/18 V, T_J = 175°C, $R_{G,ext}$ = 5 Ω, V_{DS} = 800 V



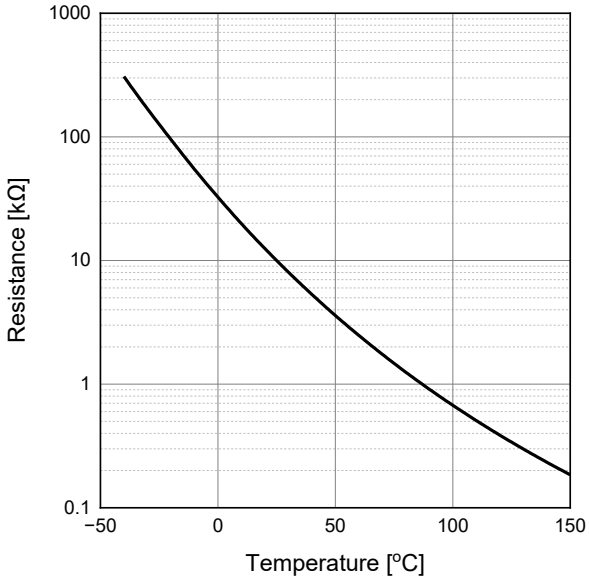
Typical switching losses vs gate resistance

$E = f(R_{G,ext})$, V_{GS} = 0/18 V, T_J = 175°C, I_D = 27.3 A, V_{DS} = 800 V



NTC thermistor characteristics

$R = f(T_{NTC})$



6 Pin description

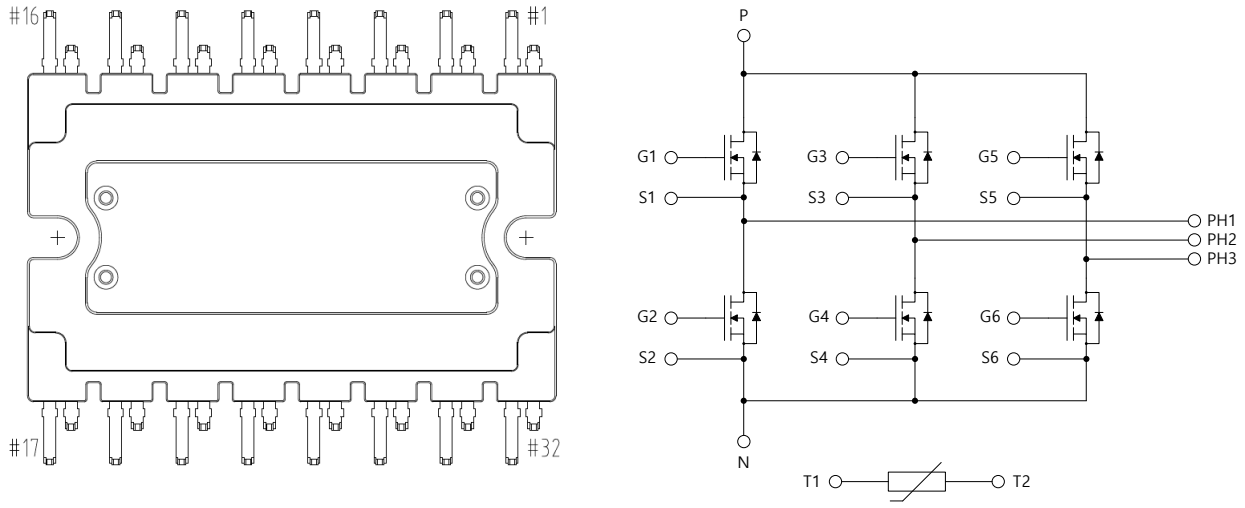


Figure 1 Pin-out (bottom view)

Table 9 Pin description

Pin number	Description	Pin number	Description
1	N	17	P
2	N	18	P
3	NC	19	G1
4	NC	20	S1
5	PH3	21	G2
6	PH3	22	S2
7	NC	23	G3
8	NC	24	S3
9	PH2	25	G4
10	PH2	26	S4
11	NC	27	G5
12	NC	28	S5
13	PH1	29	G6
14	PH1	30	S6
15	T2	31	NC
16	T1	32	NC

7 Package outline

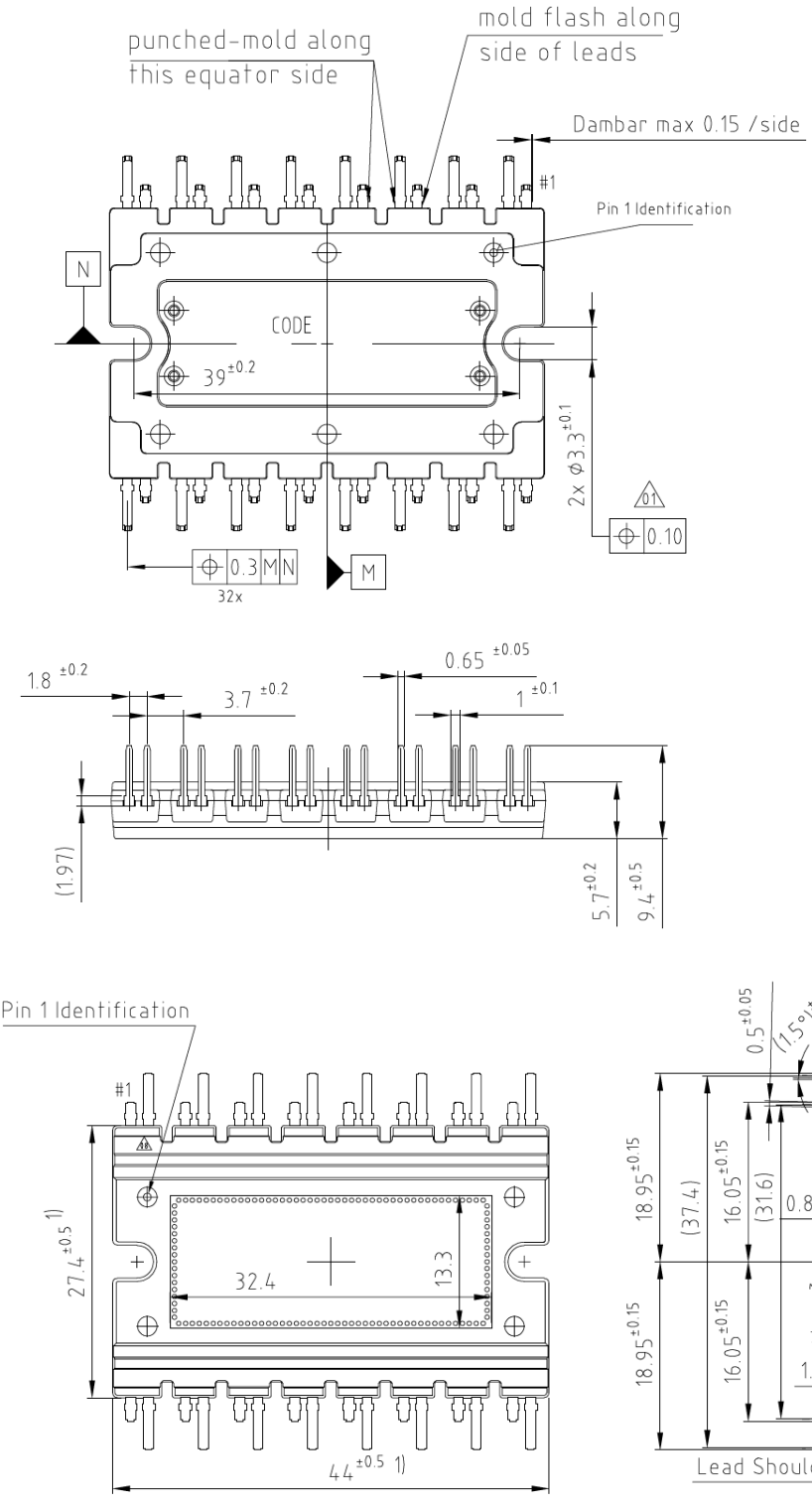


Figure 2 AMM12S25LB1Z

Revision history

Document version	Date of release	Description of changes
2.0	2026-01-30	Initial release

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