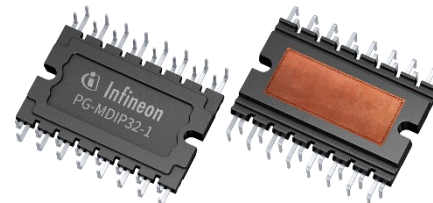


CIPOS™ Prime

AMM12S54LB2Z

Features

- 1200 V SiC MOSFET 6-pack
- 54 mΩ of typical $R_{DS(on)}$ at $V_{GS} = 18\text{ V}$, $T_J = 25^\circ\text{C}$
- Maximum operating $T_J = 175^\circ\text{C}$
- 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	
AMM12S54LB2Z	DIP 44x28DA	11 pcs / Tube	176 pcs	SP006043524



Table of contents

Features 1

Potential applications 1

Product validation 1

Description 1

Table of contents 2

1 MOSFET 3

2 MOSFET body diode 5

3 Package 6

4 Thermistor 7

5 Characteristics diagrams 8

6 Pin description 13

7 Package outline 14

Revision history 15

1 MOSFET

Table 2 Maximum ratings

Description	Symbol	Condition	Values	Unit
Drain-source voltage	V_{DS}	$T_J \geq 25^\circ\text{C}$	1200	V
Continuous drain current for $R_{th(j-c)}$, limited by $T_{J,max}$	I_D	$V_{GS} = 18\text{ V}, T_C = 25^\circ\text{C}$	34	A
		$V_{GS} = 18\text{ V}, T_C = 100^\circ\text{C}$	24	
Peak drain current, t_p limited by $T_{J,max}$	I_{DM}	$V_{GS} = 18\text{ V}$	72	A
Gate-source voltage, max. transient voltage	V_{GS}	$t_p \leq 0.5\ \mu\text{s}, D < 0.01$	-10 ~ 23	V
Gate-source voltage, max. static voltage	V_{GS}		-5 ~ 20	V
Power dissipation per switch	P_D		154	W
Operating junction temperature	T_J		-40 ~ 175	$^\circ\text{C}$

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

($T_J = 25^\circ\text{C}$ if not stated otherwise)

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Drain-source on-state resistance	$R_{DS(on)}$	$I_D = 12.9\text{ A}, V_{GS} = 18\text{ V}$		54	76.1	m Ω
		$I_D = 12.9\text{ A}, V_{GS} = 18\text{ V}, T_J = 175^\circ\text{C}$		128		
		$I_D = 12.9\text{ A}, V_{GS} = 15\text{ V}$		66		
Gate-source threshold voltage	$V_{GS(th)}$	$I_D = 4.1\text{ mA}, V_{DS} = V_{GS}$	3.5	4.2	5.1	V
		$I_D = 4.1\text{ mA}, V_{DS} = V_{GS}, T_J = 175^\circ\text{C}$		3.2		
Zero gate-voltage drain current	I_{DSS}	$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}$			110	μA
		$V_{DS} = 1200\text{ V}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$		2		
Gate leakage current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = 23\text{ V}$			120	nA
		$V_{DS} = 0\text{ V}, V_{GS} = -10\text{ V}$			-120	
Forward transconductance	g_{fs}	$I_D = 12.9\text{ A}, V_{DS} = 20\text{ V}$		5.7		S

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Internal gate resistance	$R_{G,int}$	$f = 1 \text{ MHz}, V_{AC} = 25 \text{ mV}$		13		Ω
Input capacitance	C_{iss}	$V_{DS} = 800 \text{ V}, V_{GS} = 0 \text{ V}, f = 100 \text{ kHz}, V_{AC} = 25 \text{ mV}$		971		pF
Output capacitance	C_{oss}			55		
Reverse transfer capacitance	C_{rss}			6.2		
C_{oss} stored energy	E_{oss}			22		
Total gate charge	Q_G	$V_{DS} = 800 \text{ V}, I_D = 12.9 \text{ A}, V_{GS} = 0 \text{ to } 18 \text{ V}$		34		nC
Plateau gate charge	$Q_{GS(pl)}$			15		
Gate-to-drain charge	Q_{GD}			7.2		
Turn-on energy	E_{on}	$V_{DS} = 800 \text{ V}, I_D = 12.9 \text{ A}, V_{GS} = 0 \text{ to } 18 \text{ V}, R_G = 5 \Omega$		80		μJ
		$V_{DS} = 800 \text{ V}, I_D = 12.9 \text{ A}, V_{GS} = 0 \text{ to } 18 \text{ V}, R_G = 5 \Omega, T_J = 175^\circ\text{C}$		95		
Turn-off energy	E_{off}	$V_{DS} = 800 \text{ V}, I_D = 12.9 \text{ A}, V_{GS} = 0 \text{ to } 18 \text{ V}, R_G = 5 \Omega$		50		μJ
		$V_{DS} = 800 \text{ V}, I_D = 12.9 \text{ A}, V_{GS} = 0 \text{ to } 18 \text{ V}, R_G = 5 \Omega, T_J = 175^\circ\text{C}$		55		

2 MOSFET body diode

Table 5 Maximum ratings

Description	Symbol	Condition	Values	Unit
Drain-source voltage	V_{DSS}	$T_J \geq 25^\circ\text{C}$	1200	V
Peak reverse drain current, t_p limited by $T_{J,max}$	I_{SM}	$V_{GS} = 0\text{ V}$	29	A

Table 6 Electrical characteristics

($T_J = 25^\circ\text{C}$ if not stated otherwise)

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Drain-source reverse voltage	V_{SD}	$I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}$		4.2	5.5	V
		$I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}, T_J = 175^\circ\text{C}$		4.05		
MOSFET reverse recovery charge	Q_{rr}	$V_{DS} = 800\text{ V}, I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}, di/dt = 1000\text{ A}/\mu\text{s}, Q_{rr}$ includes Q_C		0.27		μC
		$V_{DS} = 800\text{ V}, I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}, di/dt = 1000\text{ A}/\mu\text{s}, Q_{rr}$ includes $Q_C, T_J = 175^\circ\text{C}$		0.29		
MOSFET peak reverse recovery current	I_{rrm}	$V_{DS} = 800\text{ V}, I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}, di/dt = 1000\text{ A}/\mu\text{s}, Q_{rr}$ includes Q_C		20		A
		$V_{DS} = 800\text{ V}, I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}, di/dt = 1000\text{ A}/\mu\text{s}, Q_{rr}$ includes $Q_C, T_J = 175^\circ\text{C}$		21.3		
MOSFET reverse recovery energy	E_{rr}	$V_{DS} = 800\text{ V}, I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}, di/dt = 1000\text{ A}/\mu\text{s}, Q_{rr}$ includes Q_C		110		μJ
		$V_{DS} = 800\text{ V}, I_{SD} = 12.9\text{ A}, V_{GS} = 0\text{ V}, di/dt = 1000\text{ A}/\mu\text{s}, Q_{rr}$ includes $Q_C, T_J = 175^\circ\text{C}$		120		

Package

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	$R_{th(j-c)}$				0.97	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

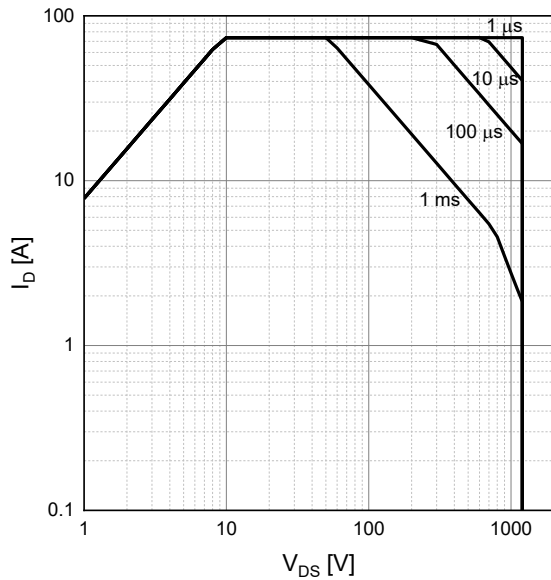
Table 8 Characteristic values

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

5 Characteristics diagrams

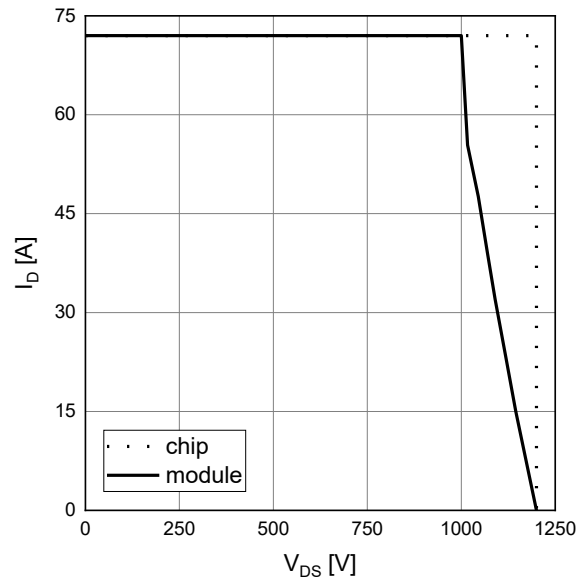
Forward bias safe operating area (FBSOA)

$I_D = f(V_{DS}), T_C = 25^\circ\text{C}, D = 0$, parameter: t_p



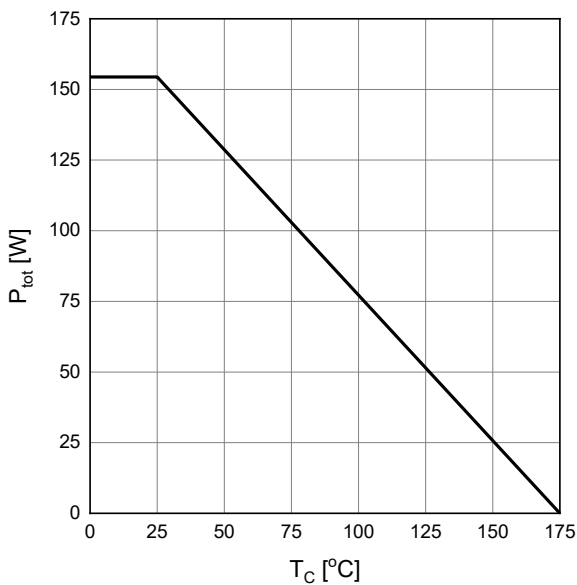
Reverse bias safe operating area (RBSOA)

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



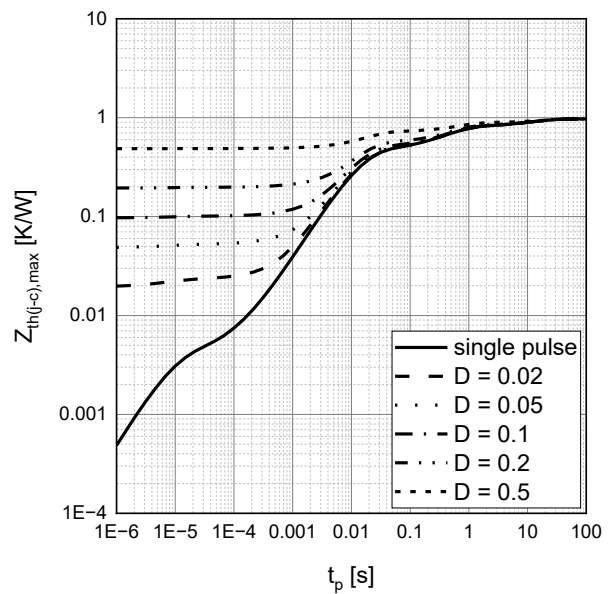
Power dissipation

$P_{tot} = f(T_C)$



Max. transient thermal impedance

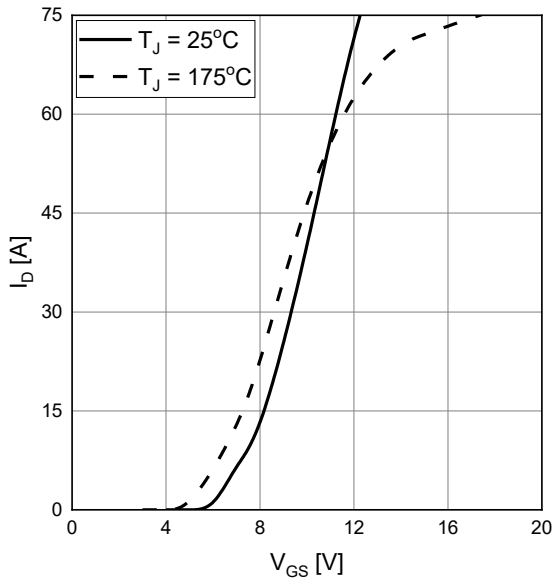
$Z_{th(j-c),max} = f(t_p), D = t_p/T$



Characteristics diagrams

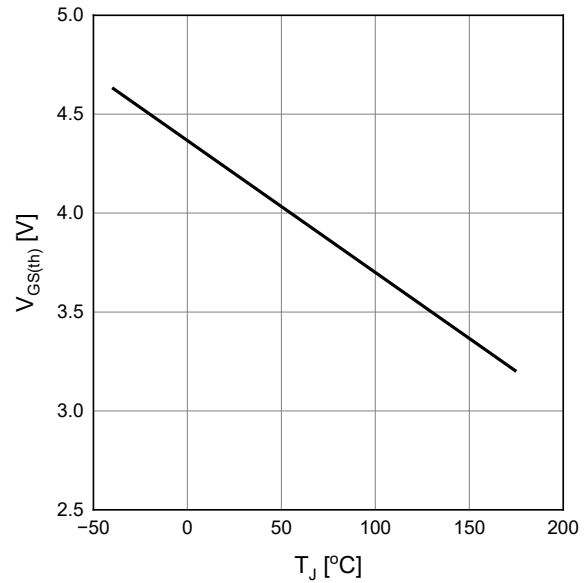
Typical transfer characteristics

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



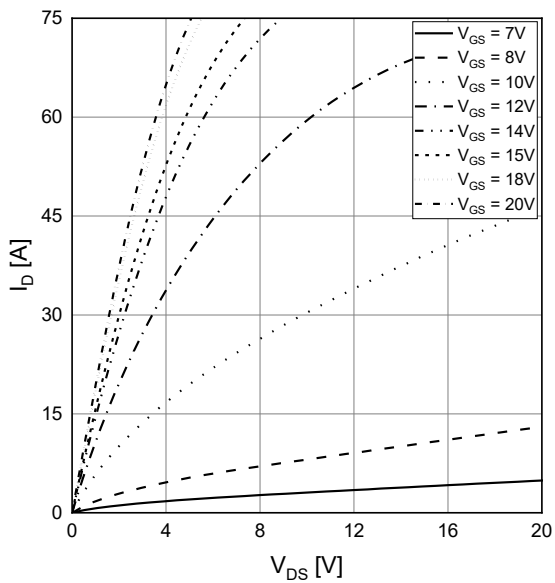
Typical gate-source threshold voltage vs junction temperature

$V_{GS(th)} = f(T_J), I_D = 4.1\text{ mA}$



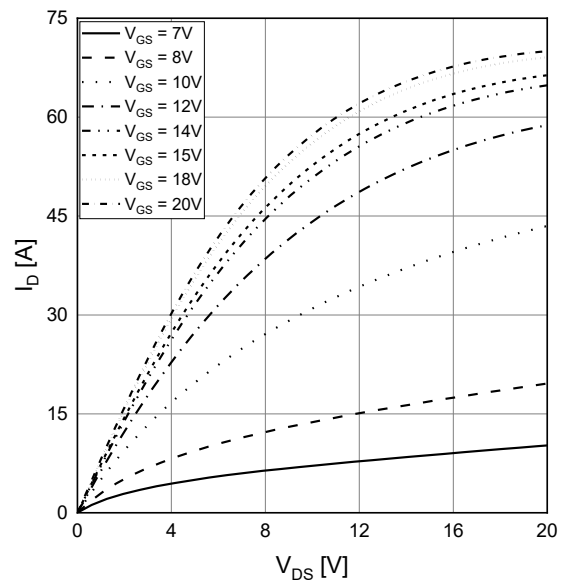
Typical output characteristics

$I_D = f(V_{DS}), T_J = 25^\circ\text{C}$



Typical output characteristics

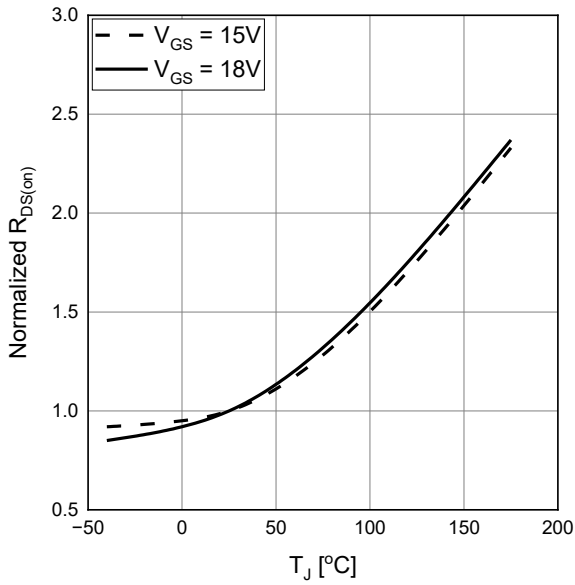
$I_D = f(V_{DS}), T_J = 175^\circ\text{C}$



Characteristics diagrams

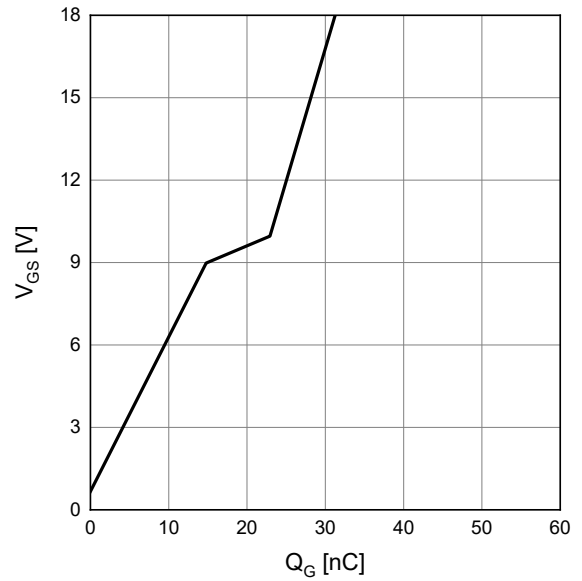
Typical on-state resistance vs junction temperature

$R_{DS(on)} = f(T_J), I_D = 12.9 A$



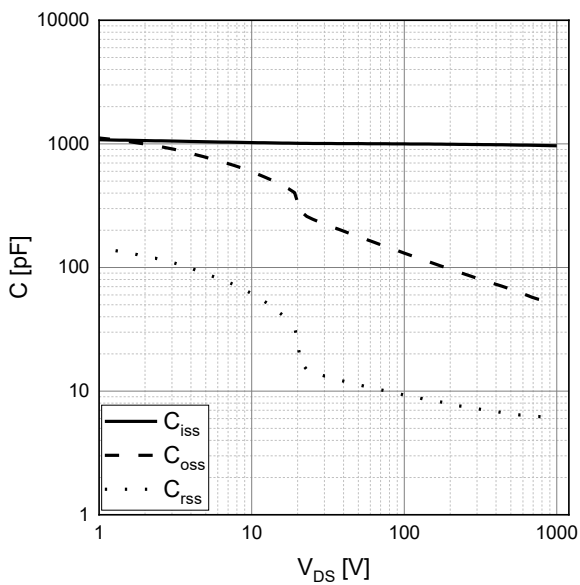
Typical gate charge

$V_{GS} = f(Q_G), I_D = 12.9 A, V_{DS} = 800 V$



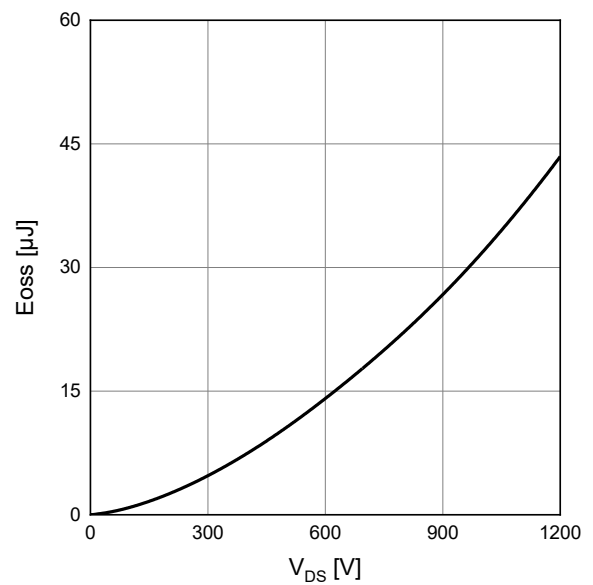
Typical capacitance vs drain-source voltage

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



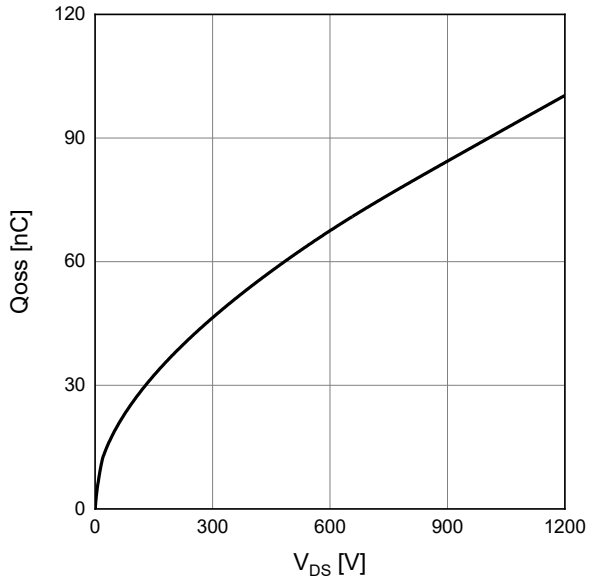
Typical Coss stored energy

$E = f(V_{DS})$



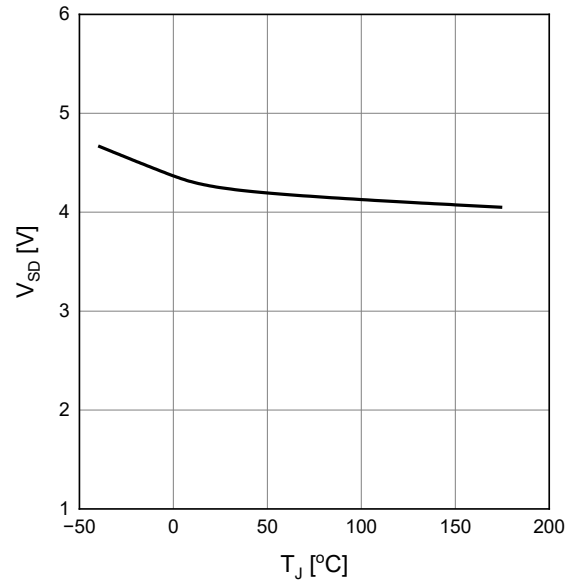
Typical Coss stored charge

$Q = f(V_{DS})$



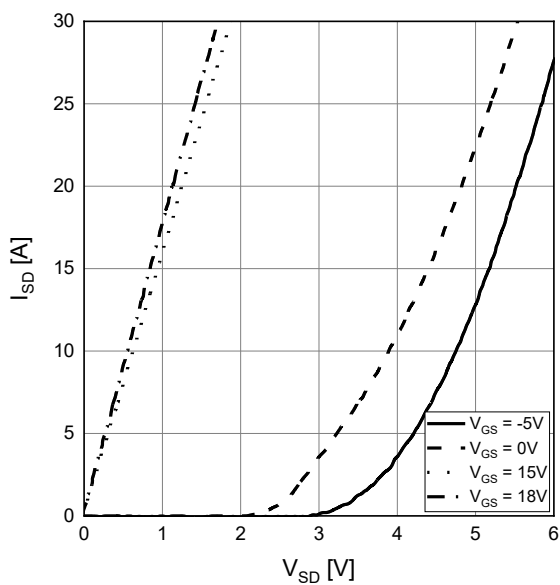
Typical reverse drain voltage characteristics

$V_{SD} = f(T_J), I_{SD} = 12.9 \text{ A}, V_{GS} = 0 \text{ V}$



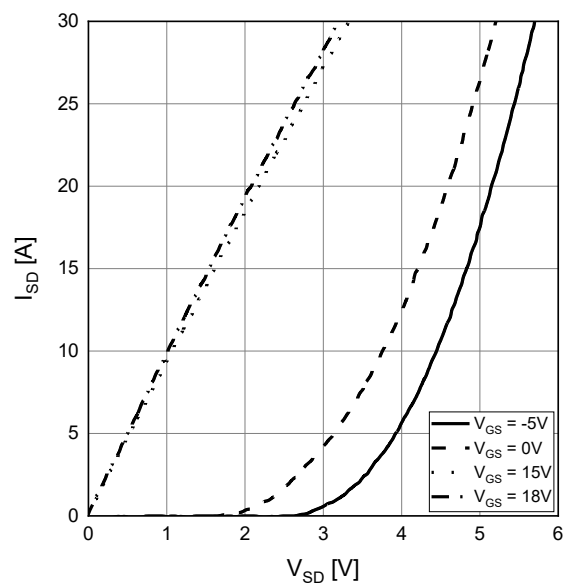
Typical reverse drain current characteristics

$I_{SD} = f(V_{SD}), T_J = 25^\circ\text{C}$



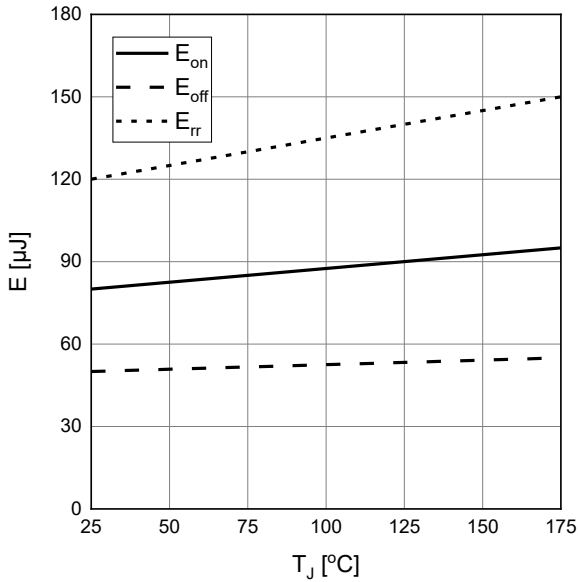
Typical reverse drain current characteristics

$I_{SD} = f(V_{SD}), T_J = 175^\circ\text{C}$



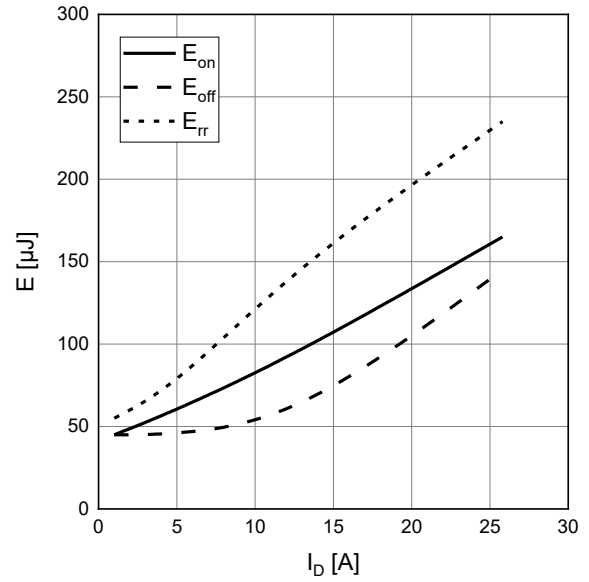
Typical switching losses vs junction temperature

$E = f(T_J), V_{GS} = 0/18\text{ V}, I_D = 12.9\text{ A}, R_{G,ext} = 5\ \Omega, V_{DS} = 800\text{ V}$



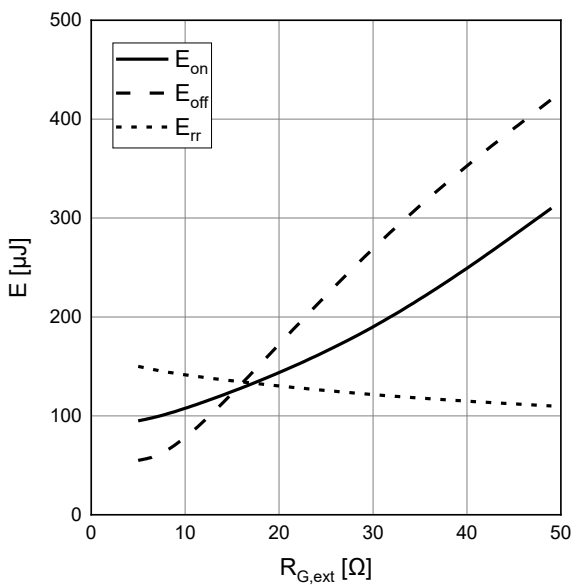
Typical switching losses vs drain current

$E = f(I_D), V_{GS} = 0/18\text{ V}, T_J = 175^\circ\text{C}, R_{G,ext} = 5\ \Omega, V_{DS} = 800\text{ V}$



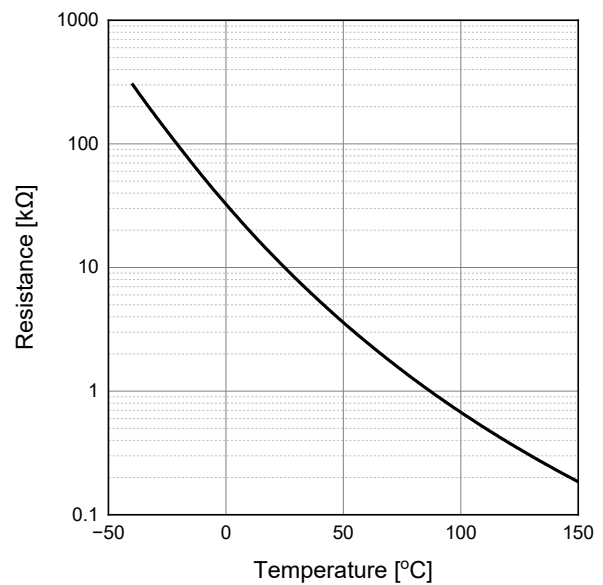
Typical switching losses vs gate resistance

$E = f(R_{G,ext}), V_{GS} = 0/18\text{ V}, T_J = 175^\circ\text{C}, I_D = 12.9\text{ A}, V_{DS} = 800\text{ V}$



NTC thermistor characteristics

$R = f(T_{NTC})$



6 Pin description

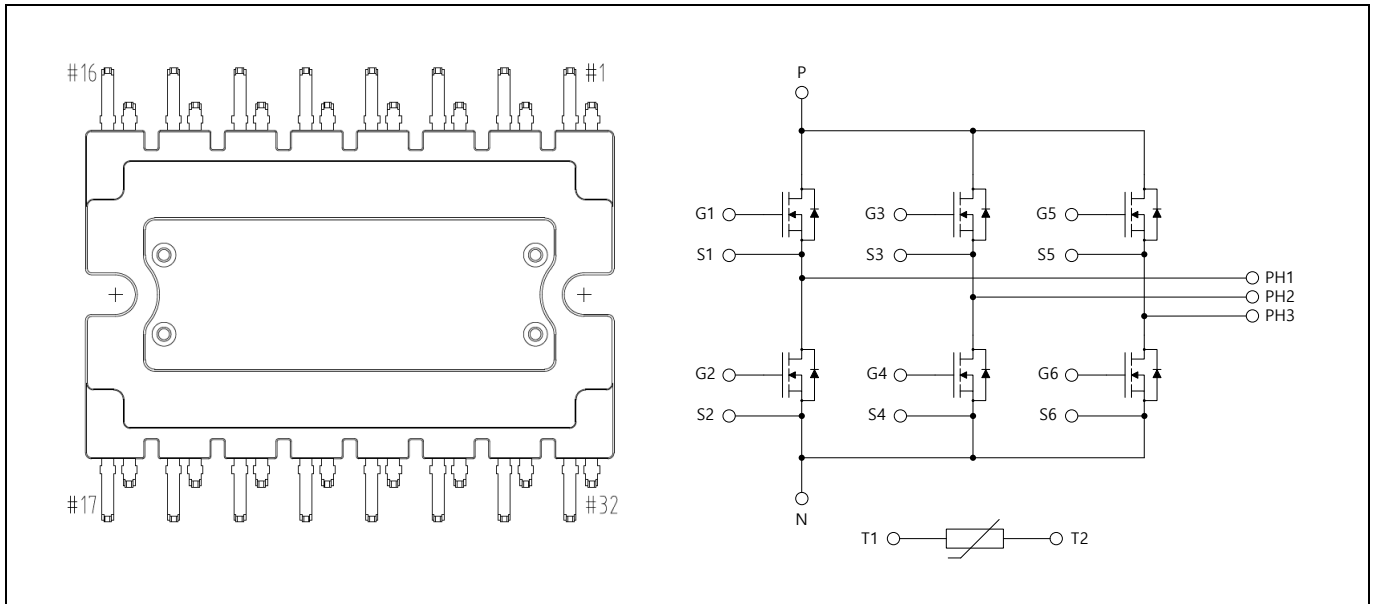


Figure 1 Pin-out (bottom view)

Table 9 Pin description

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

7 Package outline

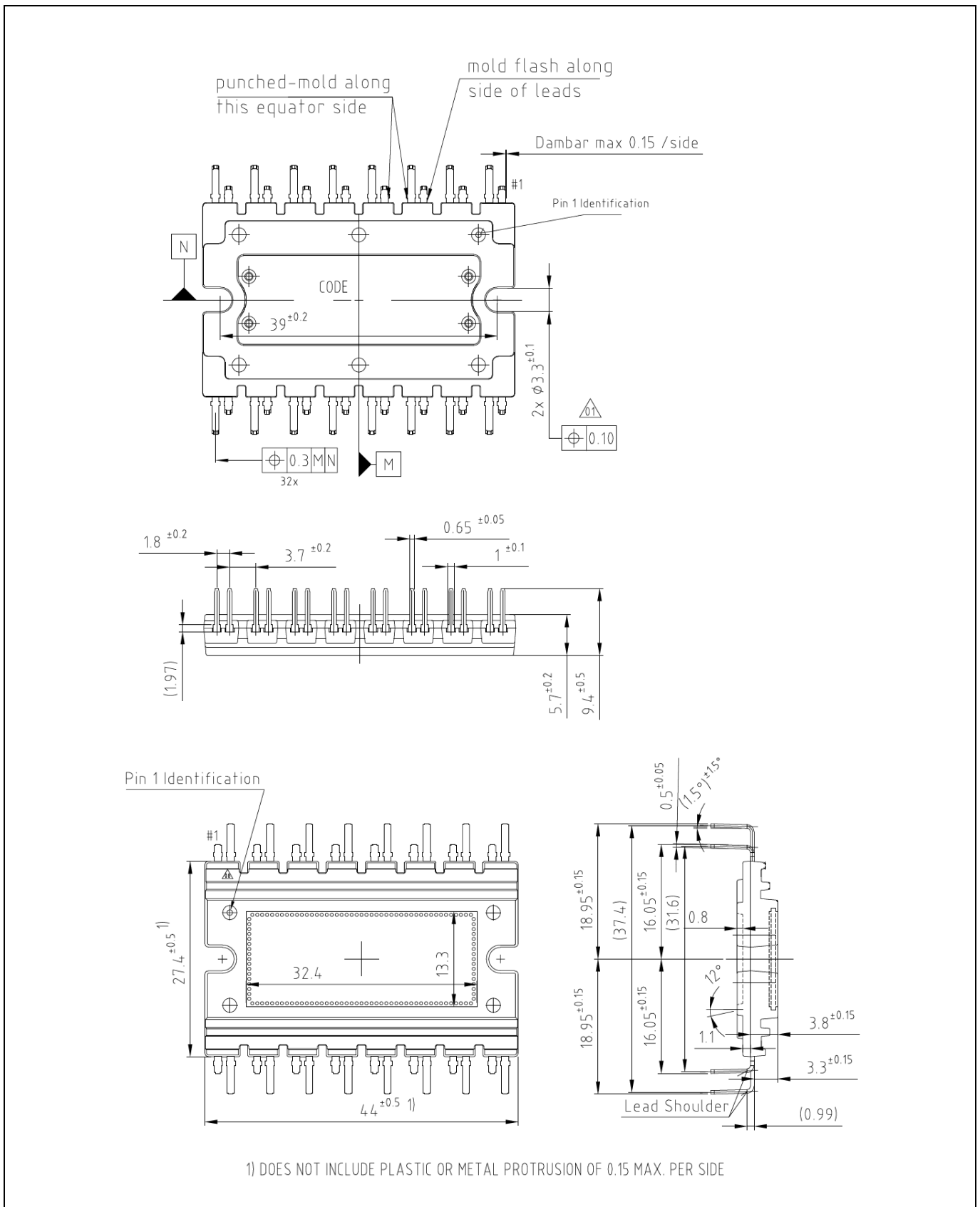


Figure 2 AMM12S54LB2Z



Revision history

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

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Edition 2026-01-30

Published by

Infineon Technologies AG

81726 Munich, Germany

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