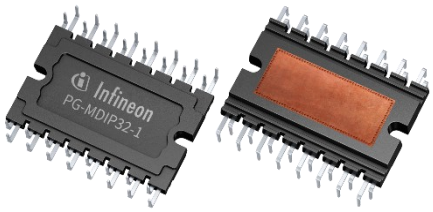
CIPOS™ Prime

AMF12S54LB2Z



Features

- 1200 V SiC MOSFET 4-pack
- 54 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 four 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	
AMF12S54LB2Z	DIP 44x28DA	11 pcs / Tube	176 pcs	SP006061262

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_{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	32	A
		V_{GS} = 18 V, T_C = 100°C	23	
Peak drain current, t_p limited by $T_{J.max}$	I_{DM}	V_{GS} = 18 V	69	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		138	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 = 12.9 A, V_{GS} = 18 V		54	76.1	mΩ
		I_D = 12.9 A, V_{GS} = 18 V, T_J = 175°C		128		
		I_D = 12.9 A, V_{GS} = 15 V		66		
Gate-source threshold voltage	$V_{GS(th)}$	I_D = 4.1 mA, V_{DS} = V_{GS}	3.5	4.2	5.1	V
		I_D = 4.1 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			110	µA
		V_{DS} = 1200 V, V_{GS} = 0 V, T_J = 175°C		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 = 12.9 A, V_{DS} = 20 V		5.7		S

Description	Symbol	Condition	Values			Unit
			Min.	Typ.	Max.	
Internal gate resistance	$R_{G,int}$	f = 1 MHz, V_{AC} = 25 mV		13		Ω
Input capacitance	C_{iss}	V_{DS} = 800 V, V_{GS} = 0 V, f = 100 kHz, V_{AC} = 25 mV		971		pF
Output capacitance	C_{oss}			55		
Reverse transfer capacitance	C_{rss}			6.2		
C_{oss} stored energy	E_{oss}			22		µJ
Total gate charge	Q_G	V_{DS} = 800 V, I_D = 12.9 A, V_{GS} = 0 to 18 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 V, I_D = 12.9 A, V_{GS} = 0 to 18 V, R_G = 5 Ω		80		µJ
		V_{DS} = 800 V, I_D = 12.9 A, V_{GS} = 0 to 18 V, R_G = 5 Ω, T_J = 175°C		95		
Turn-off energy	E_{off}	V_{DS} = 800 V, I_D = 12.9 A, V_{GS} = 0 to 18 V, R_G = 5 Ω		50		µJ
		V_{DS} = 800 V, I_D = 12.9 A, V_{GS} = 0 to 18 V, R_G = 5 Ω, T_J = 175°C		55		

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	29	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}	$I_{SD} = 12.9$ A, $V_{GS} = 0$ V		4.2	5.5	V
		$I_{SD} = 12.9$ A, $V_{GS} = 0$ V, $T_J = 175°C$		4.05		
MOSFET reverse recovery charge	Q_{rr}	$V_{DS} = 800$ V, $I_{SD} = 12.9$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C		0.27		µC
		$V_{DS} = 800$ V, $I_{SD} = 12.9$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C, $T_J = 175°C$		0.29		
MOSFET peak reverse recovery current	I_{rrm}	$V_{DS} = 800$ V, $I_{SD} = 12.9$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C		20		A
		$V_{DS} = 800$ V, $I_{SD} = 12.9$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C, $T_J = 175°C$		21.3		
MOSFET reverse recovery energy	E_{rr}	$V_{DS} = 800$ V, $I_{SD} = 12.9$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C		110		µJ
		$V_{DS} = 800$ V, $I_{SD} = 12.9$ A, $V_{GS} = 0$ V, di/dt = 1000 A/µs, Q_{rr} includes Q_C, $T_J = 175°C$		120		

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	$R_{th(j-c)}$				1.08	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

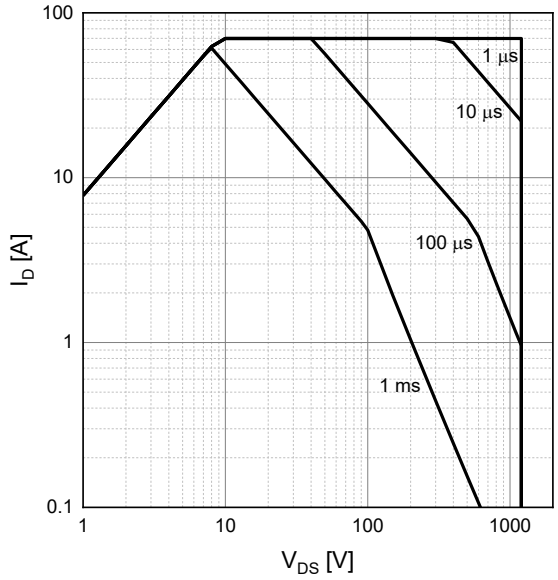
Table 8 Characteristic values

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

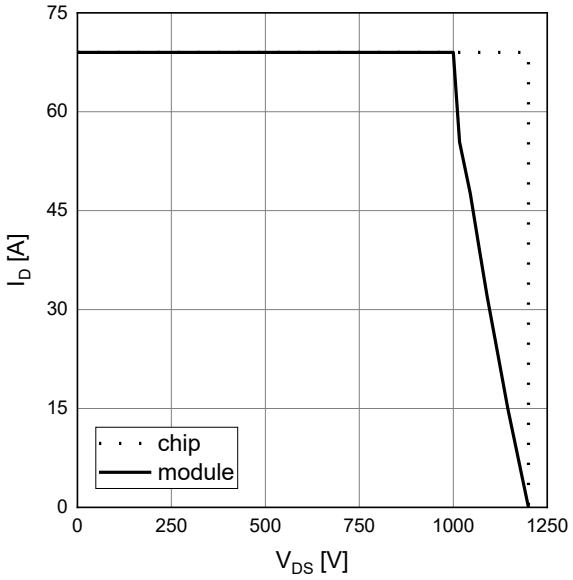
Forward bias safe operating area (FBSOA)

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



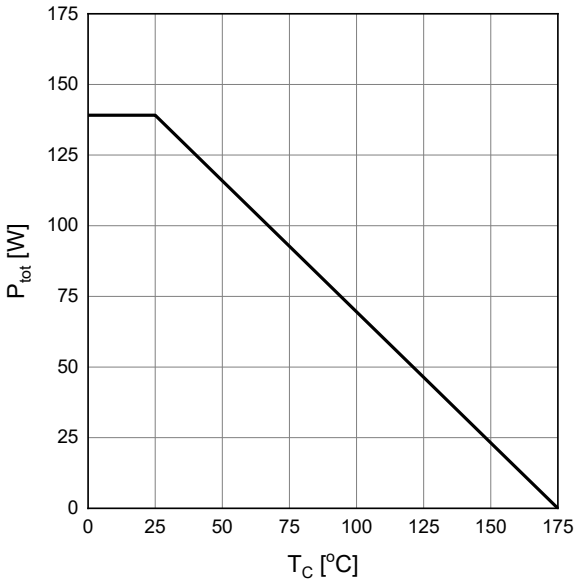
Reverse bias safe operating area (RBSOA)

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



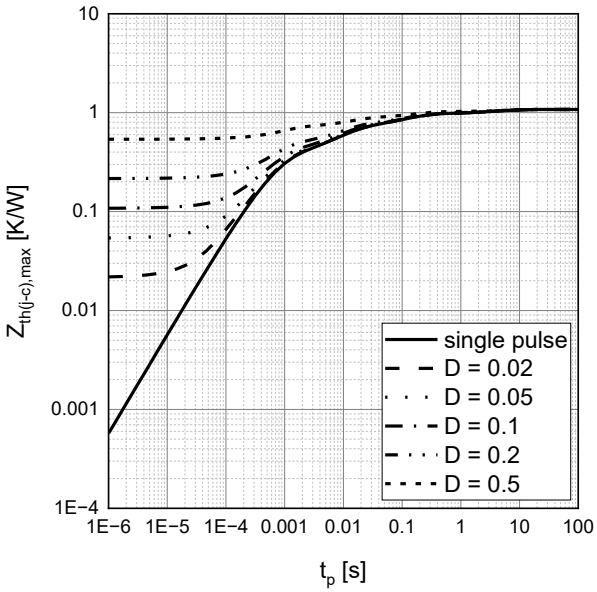
Power dissipation

$P_{tot} = f(T_C)$



Max. transient thermal impedance

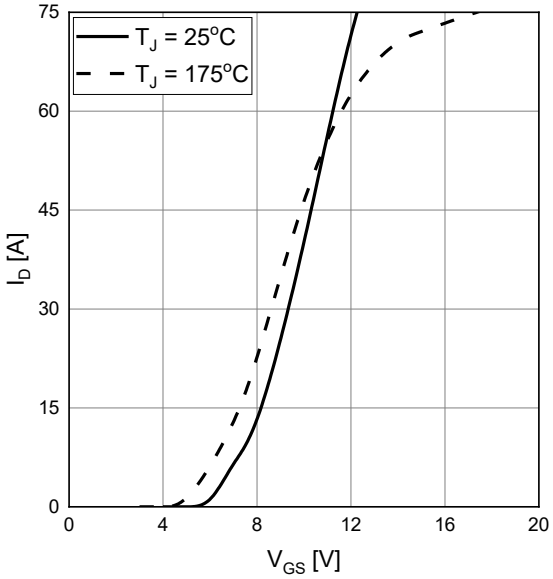
$Z_{th(j-c),max} = f(t_p)$, $D = t_p/T$



Characteristics diagrams

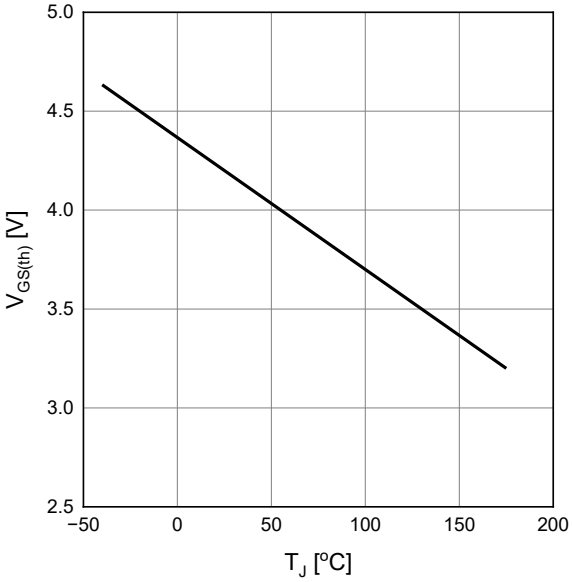
Typical transfer characteristics

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



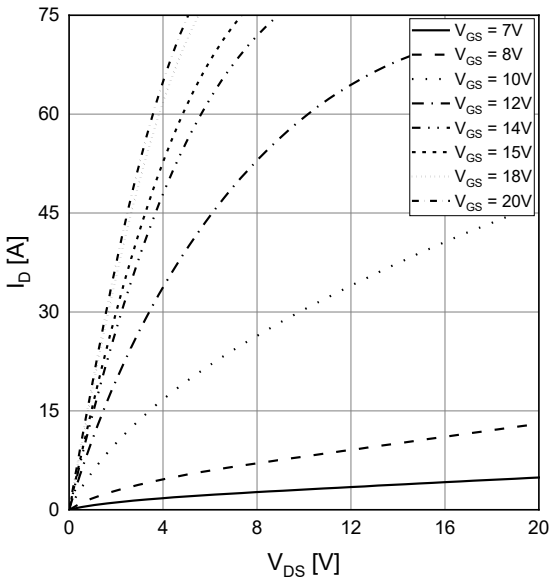
Typical gate-source threshold voltage vs junction temperature

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



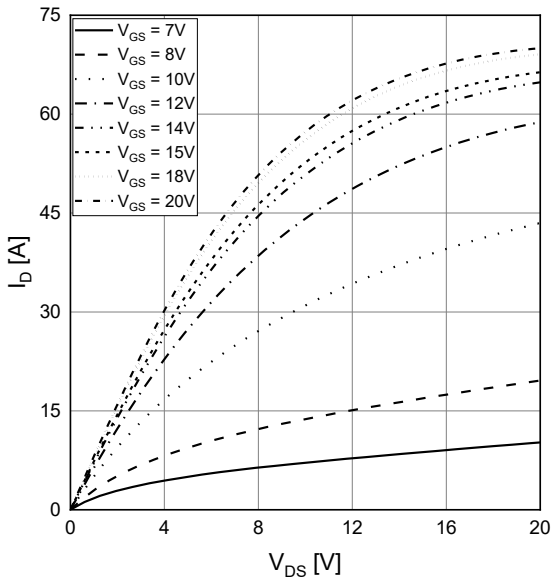
Typical output characteristics

$I_D = f(V_{DS})$, T_J = 25°C



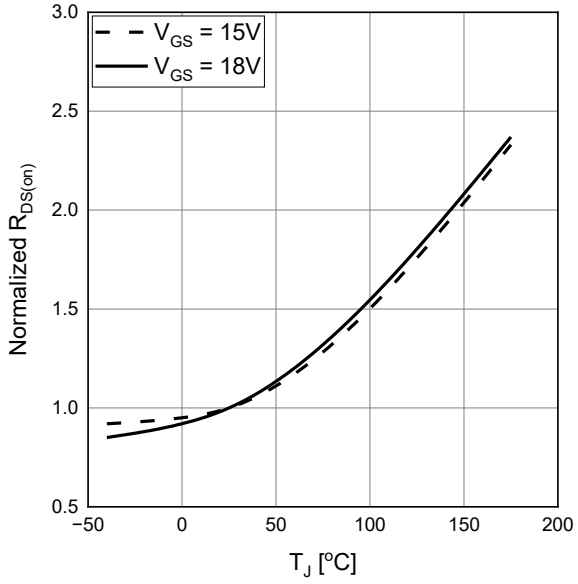
Typical output characteristics

$I_D = f(V_{DS})$, T_J = 175°C



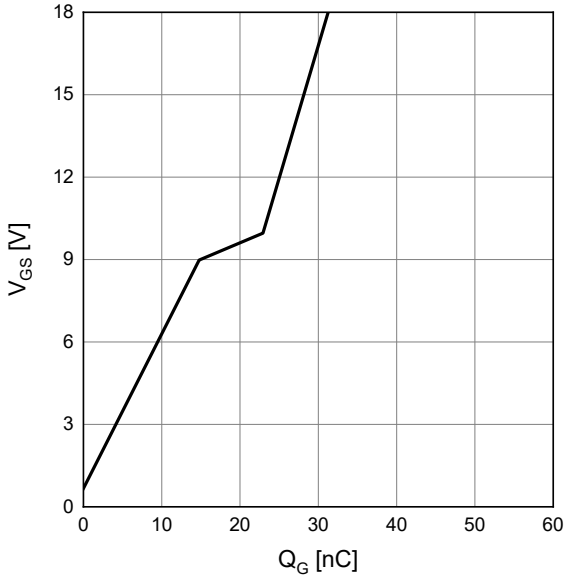
Typical on-state resistance vs junction temperature

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



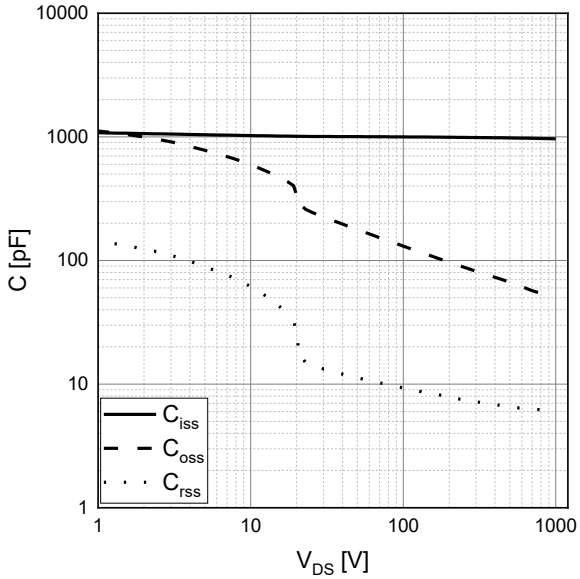
Typical gate charge

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



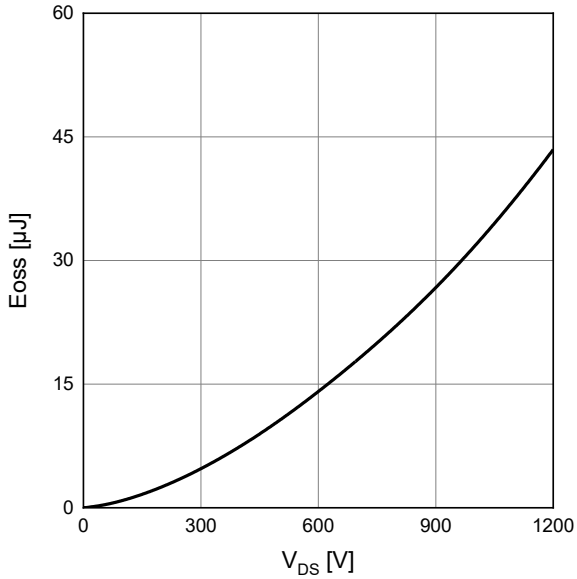
Typical capacitance vs drain-source voltage

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



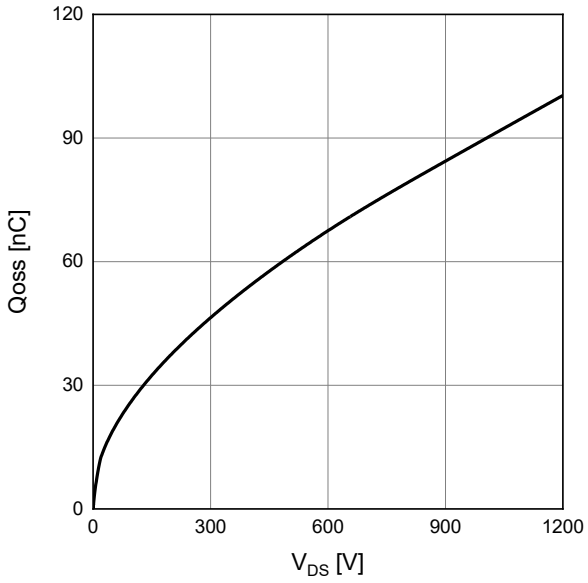
Typical Coss stored energy

$E = f(V_{DS})$



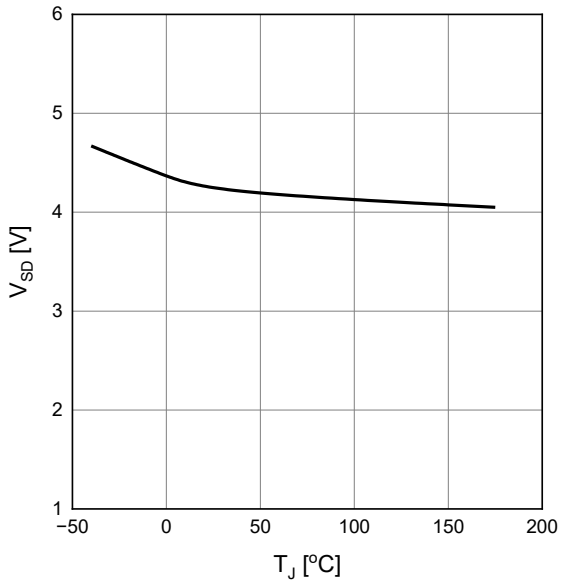
Typical Coss stored charge

$Q = f(V_{DS})$



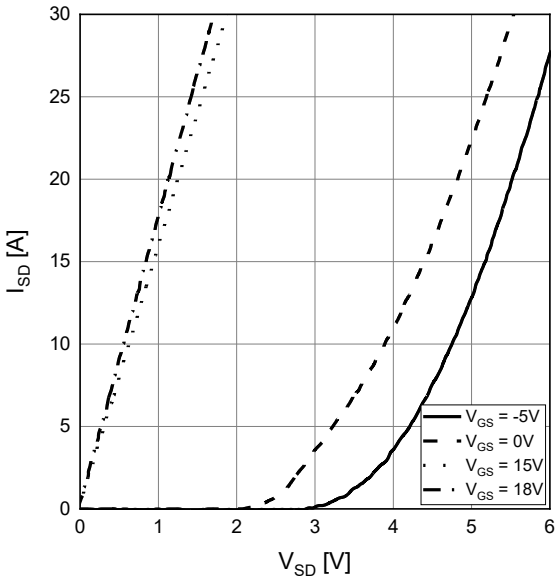
Typical reverse drain voltage characteristics

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



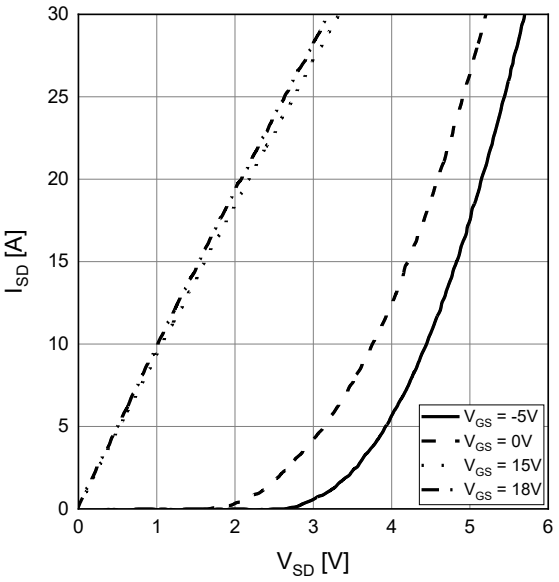
Typical reverse drain current characteristics

$I_{SD} = f(V_{SD})$, T_J = 25°C



Typical reverse drain current characteristics

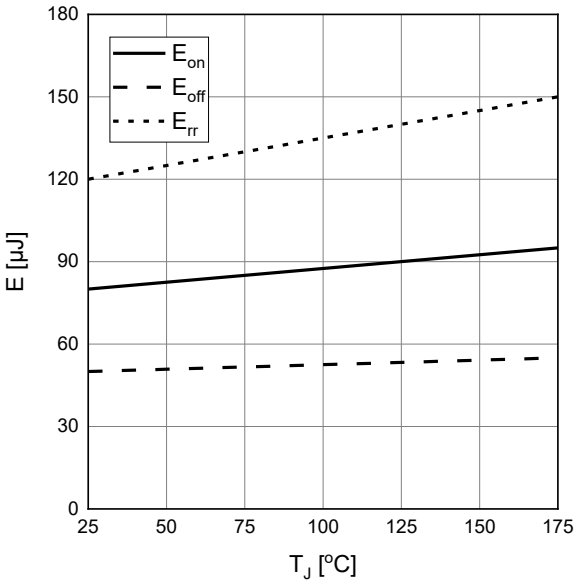
$I_{SD} = f(V_{SD})$, T_J = 175°C



Characteristics diagrams

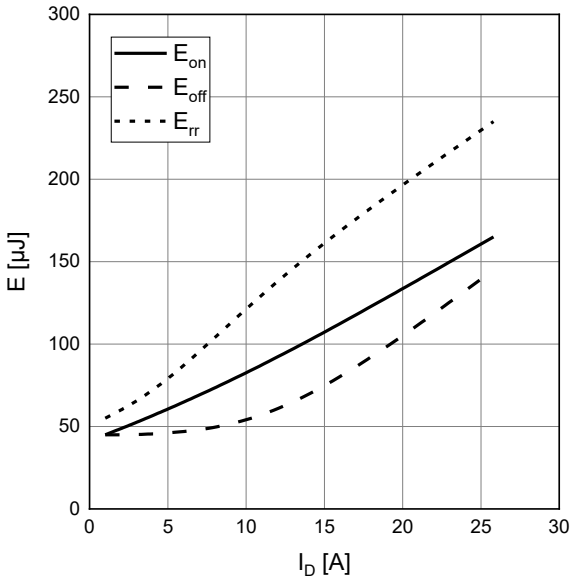
Typical switching losses vs junction temperature

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



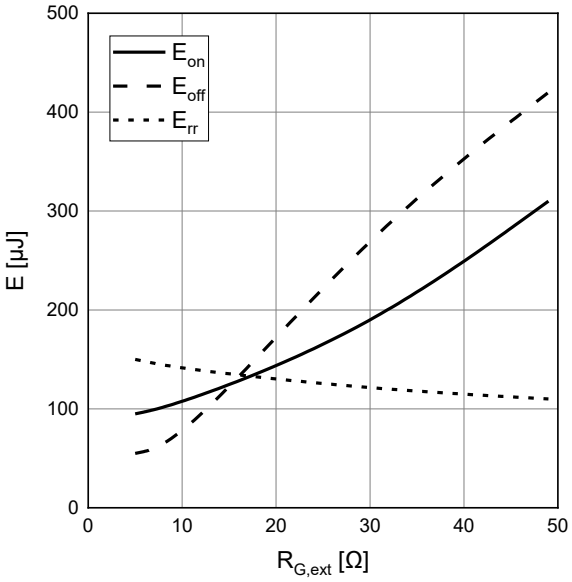
Typical switching losses vs drain current

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



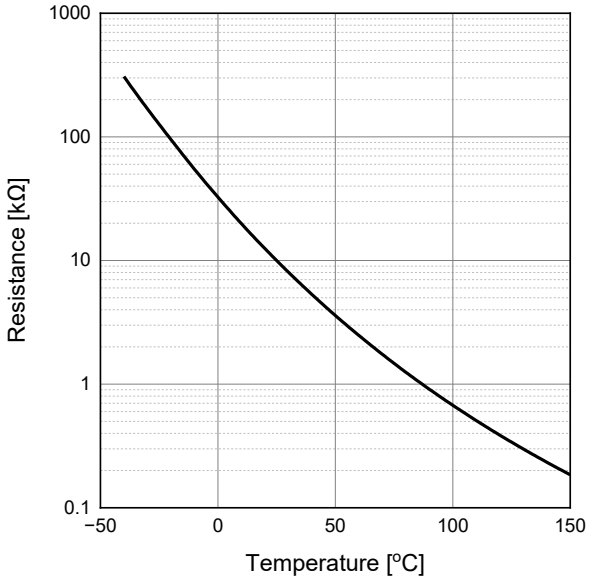
Typical switching losses vs gate resistance

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

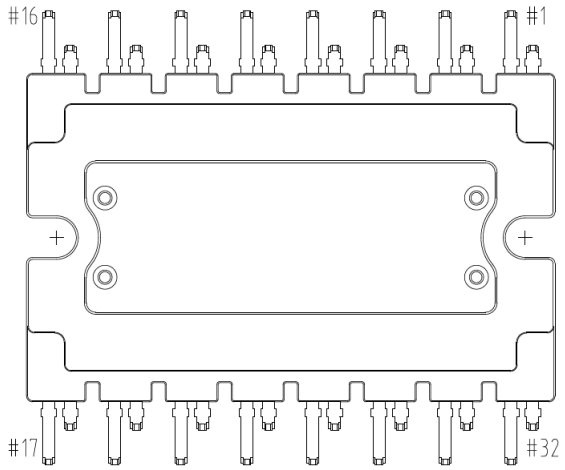


NTC thermistor characteristics

$R = f(T_{NTC})$



6 Pin description



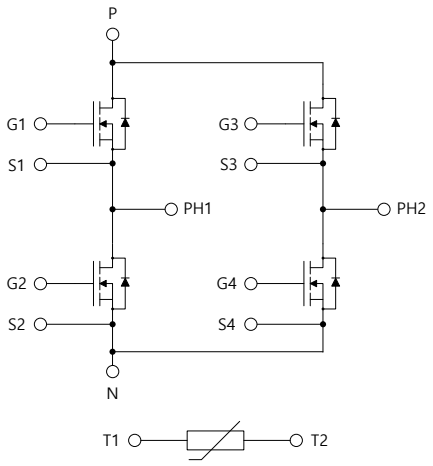


Figure 1 Pin-out (bottom view)

Table 9 Pin description

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

7 Package outline

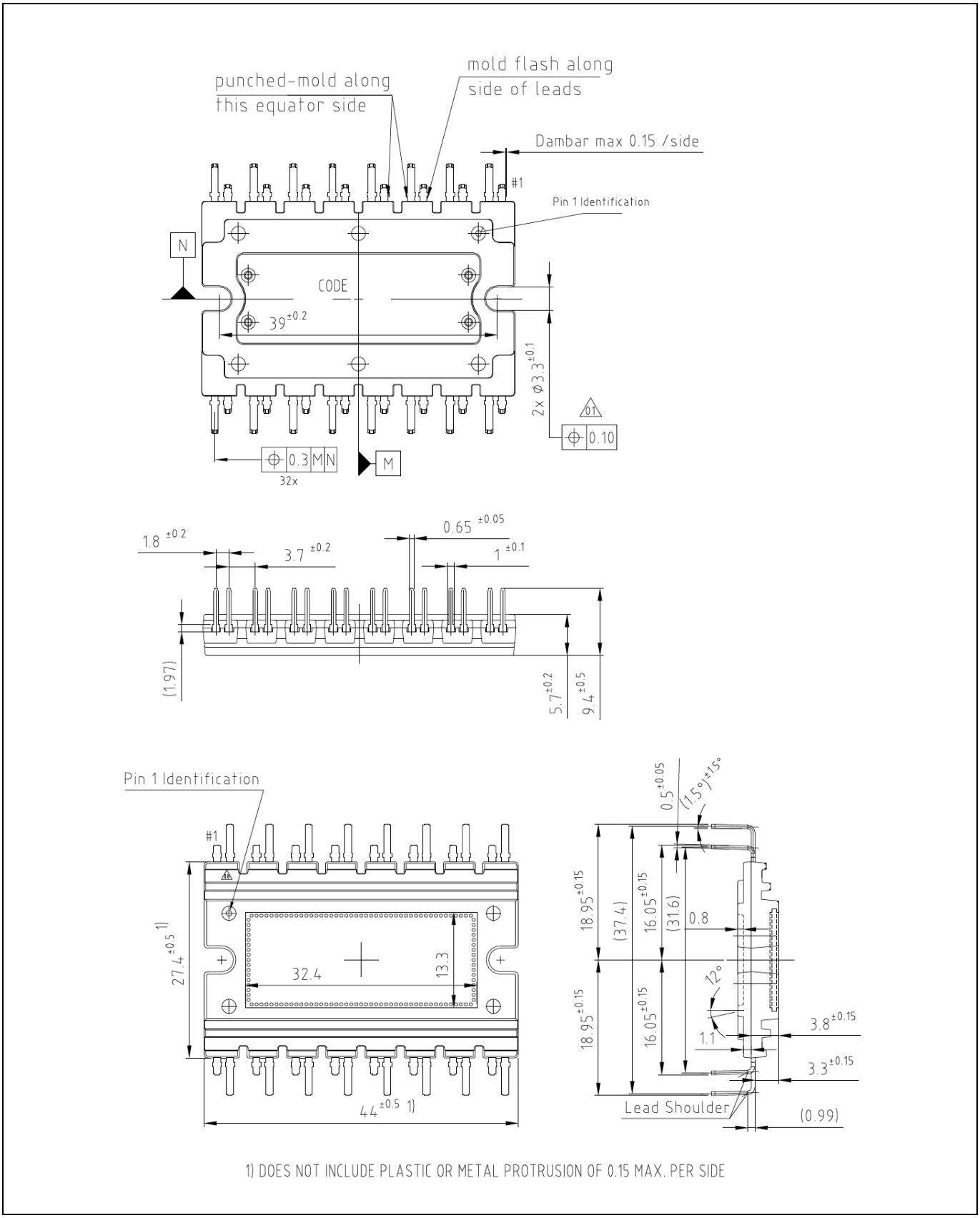


Figure 2 AMF12S54LB2Z

Revision history

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

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

Edition 2026-01-30

Published by

Infineon Technologies AG

81726 Munich, Germany

Do you have a question about this document?

Email: erratum@infineon.com

Document reference

ifx1

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics (“Beschaffenheitsgarantie”) .

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer’s compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer’s products and any use of the product of Infineon Technologies in customer’s applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer’s technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (**www.infineon.com**).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies’ products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Power Management Specialised - PMIC ***category:***

Click to view products by Infineon ***manufacturer:***

Other Similar products are found below :

FAN7710VN L5956 LA5657H-N-TLM-E AS3729B-BWLM L5959 LV56841PVD-XH S6AE102A0DGN1B200 L9916 L9915-CB LPTM21L-1ABG100I FDMF5085 WL2868C-20/TR TLE9263-3BQX TLE9263QX TEA2095T/1J RK805-2 EG1615 EG8026 TC1017-2.5VLTTR NCP81521MNTXG ACT88325VA135-T ISL91212AIIZ-TR5923 RT5074AGQW RK817-5 RK809-5 RK808-B RK806-1 RK809-3 SN1509006RHLR TPS53623RSMR AXP2101 L9916B STHV748SQ MFS2323BMBA0EP CS32G021K8U6 TPA626-VR-S MFS2613AMDHKAD SNXH150B95H3Q2F2PG-N MFS2303BMMA4EP MFS2401AVMAFES MPF5302AMMAAES MPF5301AMMABES MPF9453AVMB1HN MPF5300AMMALES CPX200D MC34VR5100A1EP TP-1303 TP-1305 TP-1603 TP-2305