●General Description

It combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$.

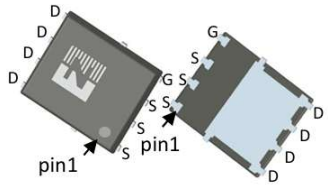
●Features

■Low $R_{DS(ON)}$ to minimize conductive loss
■Low Gate Charge for fast switching
■Low thermal resistance
■AEC-Q101 qualified

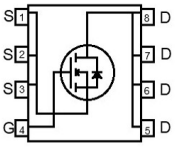
●Application

■BLDC motor driver
■DC-DC
■Load switch

●Product Summary



DFN5*6



V_{DS}=100V
$R_{DS(ON)}$ =8.8mR
I_D=72A

RoHS REACH COMPLIANT HF

●Ordering Information

Part NO.	ZMSA100N10N
Marking	ZMS100N10
Packing information	REEL TAPE
Basic ordering unit (pcs)	3000

●Absolute Maximum Ratings（T_A=25℃,unless otherwise specified）

Parameter	Symbol	Conditions	Min.	Max.	Unit
Drain-source voltage	V_{DS}	25℃≤Tj≤175℃	-	100	V
Gate-source voltage①	V_{GS}	DC; -55℃≤Tj≤175℃	-20	20	V
Continuous drain current	I_D	V_{GS}=10V, T_C=25℃	-	72	A
	I_D	V_{GS}=10V, T_C=75℃	-	59	A
	I_D	V_{GS}=10V, T_C=100℃	-	51	A
Pulsed drain current	I_{DM}	Pulsed; t_p ≤ 10 μs; T_C = 25 °C;	-	280	A
Diode continuous current	I_S	V_{GS}=0V, T_C=25℃	-	72	A
Diode pulse current	$I_{S,pulse}$	Pulsed; t_p ≤ 10 μs; T_C = 25 °C;	-	280	A
Total power dissipation	P_D	V_{GS}＞6V, T_C=25℃	-	125	W
Total power dissipation	P_D	V_{GS}＞6V, T_A=25℃	-	4.3	W
Operating junction temperature	T_J		-55	175	℃
Storage temperature	T_{STG}		-55	175	℃
Single pulse avalanche energy	E_{AS}	L=0.1mH, V_{GS}=10V, R_g=25Ω	-	88	mJ

Single pulse avalanche energy	E_{AS}	L=0.5mH, V_{GS}=10V, R_g=25Ω	-	146	mJ
ESD level (HBM)			CLASS 2		

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	1.2	°C/W
Thermal resistance, junction - ambient	R_{thJA}②	-	-	45	°C/W
Soldering temperature	T_{sold}	-	-	260	°C

●Electronic Characteristics (T_j=25°C, unless otherwise specified)

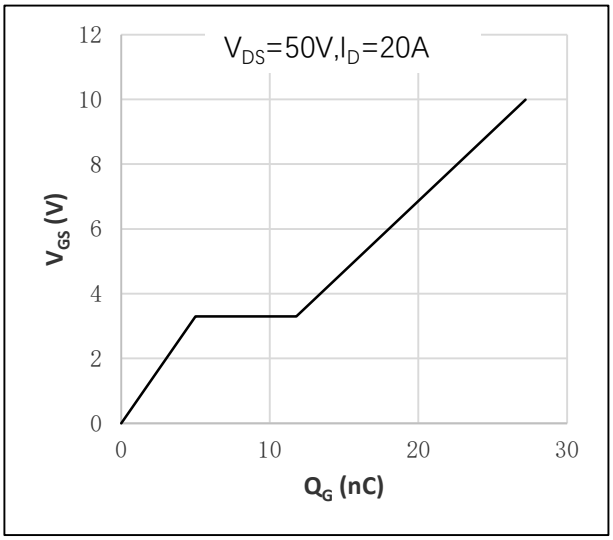
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	V_{GS} =0V, I_D =250uA, T_j=25℃	100	-	-	V
		V_{GS} =0V, I_D =1mA, T_j=-55℃	95.3	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA, T_j=25℃	1.3	1.8	2.5	V
		V_{GS}=V_{DS}, I_D=1mA, T_j=-55℃	-	-	2.9	V
		V_{GS}=V_{DS}, I_D=1mA, T_j=175℃	0.7	-	-	V
Drain-source leakage current	I_{DSS}	V_{GS}=0V, V_{DS}=100V, T_j=25℃	-	-	1	uA
		V_{GS}=0V, V_{DS}=100V, T_j=175℃	-	-	500	uA
Gate- source leakage current	I_{GSS}	V_{GS}=±20V, V_{DS} =0V	-	-	±100	nA
Static drain-source on resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A, T_j=25℃	-	8.8	11	mΩ
		V_{GS}=10V, I_D=20A, T_j=175℃	-	19.1	-	mΩ
		V_{GS}=4.5V, I_D=16A, T_j=25℃	-	12	15	mΩ
Forward transconductance	g_{FS}	V_{DS} =5V, I_{SD} = 10A	-	17	-	S
Diode forward voltage	V_{FSD}	V_{GS} =0V, I_{SD} = 20A	-	0.8	1.3	V

●Dynamic characteristics (T_j=25°C, unless otherwise specified)

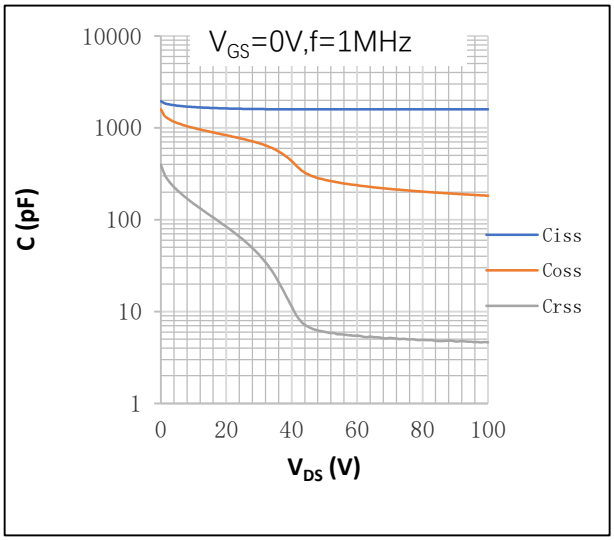
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz, V_{DS}=50V, V_{GS}=0V	-	1598	-	pF
Output capacitance	C_{oss}		-	271	-	pF
Reverse transfer capacitance	C_{rss}		-	6	-	pF
Gate resistance	R_g	f = 1MHz	-	1.8	-	Ω
Total gate charge	Q_g	V_{DD} = 50V, I_D = 20A, V_{GS} = 10V	-	27.2	-	nC
	Q_g(4.5V)		-	14.6	-	nC
Gate-source charge	Q_{gs}		-	5	-	nC
Gate-drain charge	Q_{gd}		-	6.8	-	nC

Turn-on delay time	$t_{D(on)}$	V_{GS}=10V, V_{DS}=50V, R_G =3.3Ω, I_D =20A	-	8	-	ns
Turn-on rise time	t_r		-	6	-	ns
Turn-off delay time	$t_{D(off)}$		-	40	-	ns
Turn-off fall time	t_f		-	36	-	ns
Reverse recovery time	t_{rr}	V_{DD}=50V, dI_S/dt = 100A/us, I_S=20A	-	52	-	ns
Reverse recovery charge	Q_{rr}		-	83	-	nC

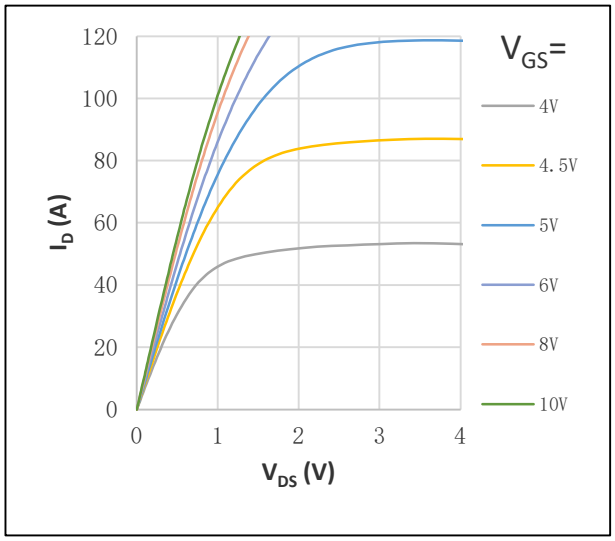
●Fig.1 Gate-source voltage as a function of gate charge; Typical values; T_j=25℃



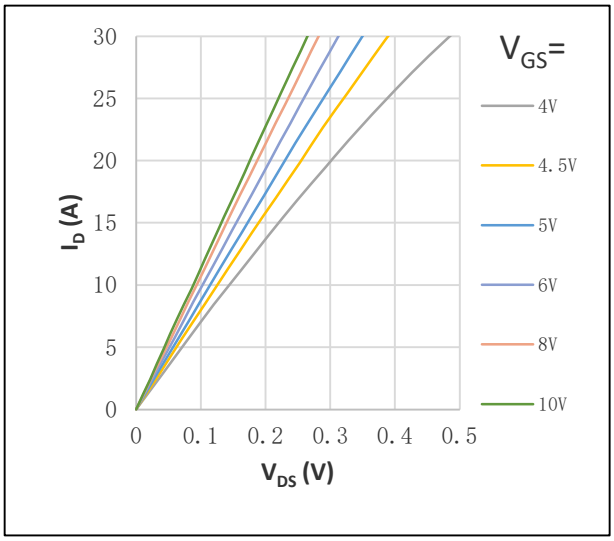
●Fig.2 Input, output and reverse transfer capacitances as a function of drain-source voltage; Typical values; T_j=25℃



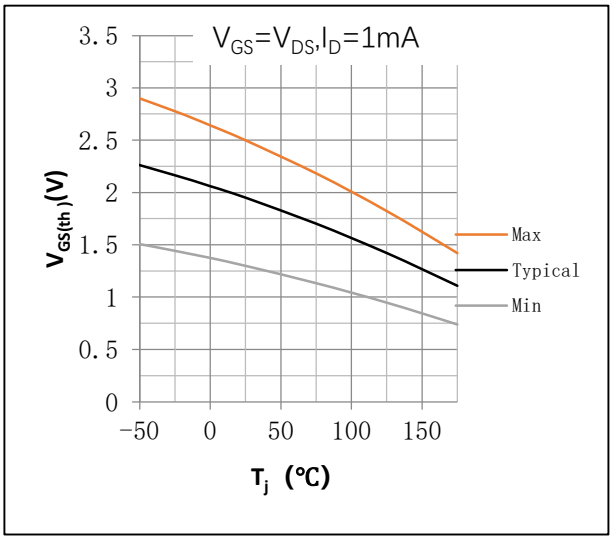
●Fig.3 Output characteristics: drain current as a function of drain-source voltage; Typical values; T_j=25℃



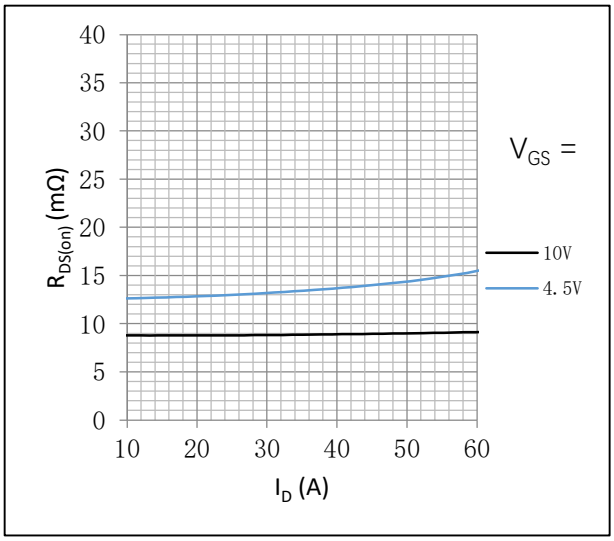
●Fig.4 Output characteristics: drain current as a function of drain-source voltage; Typical values: Expanded curve; T_j=25℃



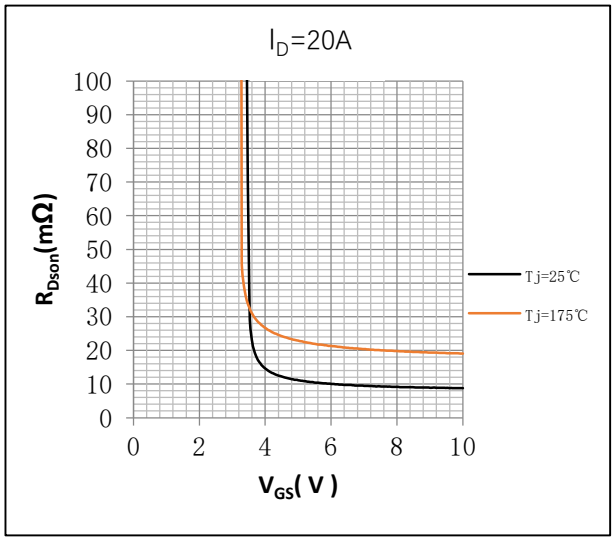
●Fig.5 Gate-source threshold voltage as a function of junction temperature; Typical/Min/Max values



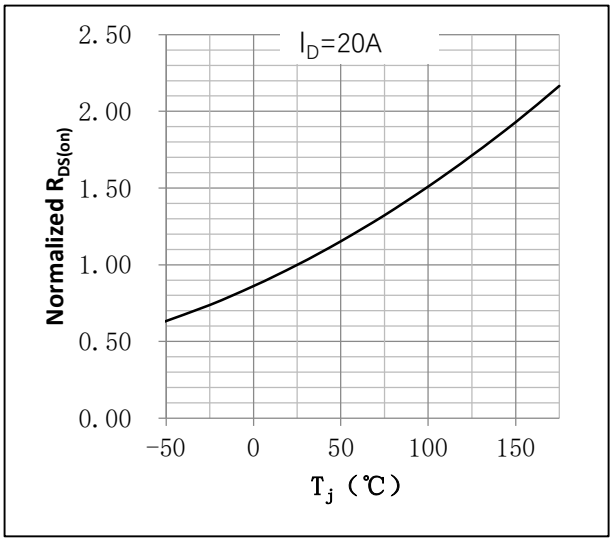
●Fig.6 Drain-source on-state resistance as a function of drain current; Typical values; Tj=25℃



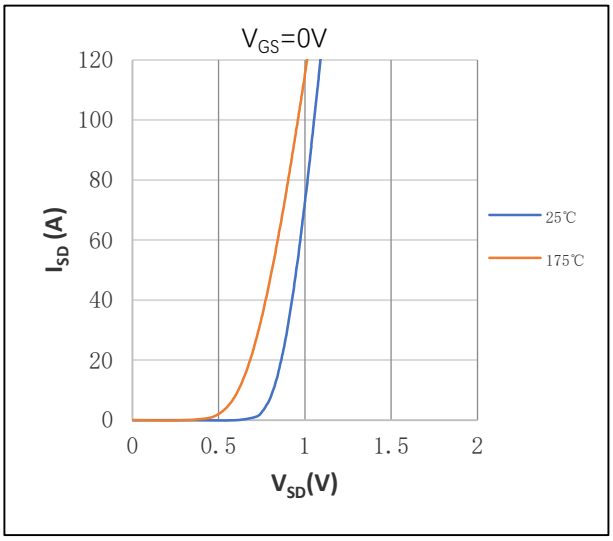
●Fig.7 Drain-source on-state resistance as a function of gate-source voltage; Typical values



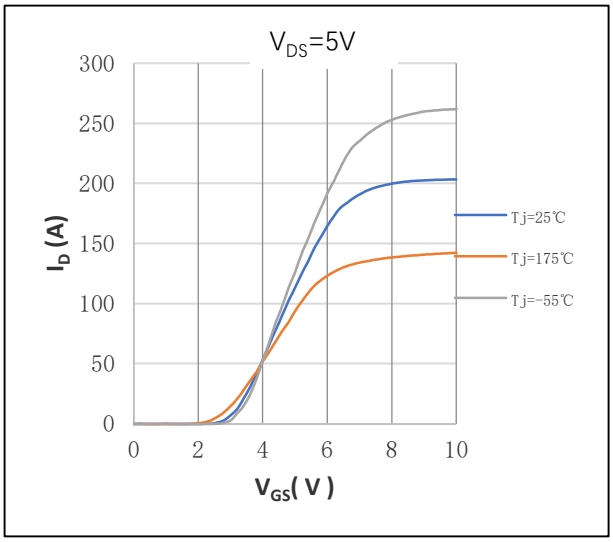
●Fig.8 Normalized drain-source on-state resistance factor as a function of junction temperature; Typical values Normalized On-Resistance=R_{DSon}/R_{DSon}(25℃)



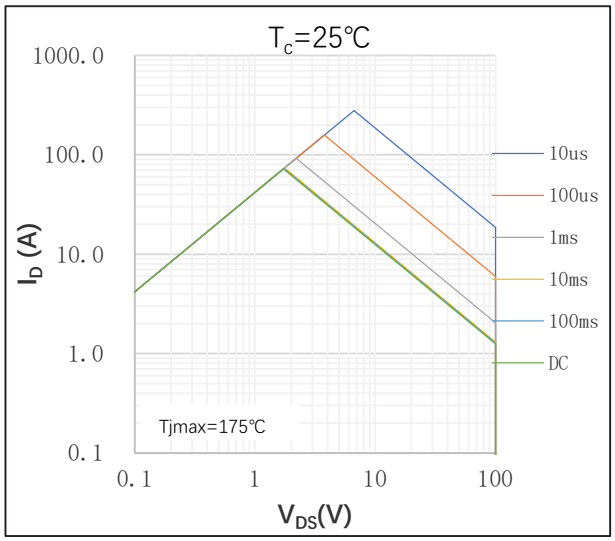
●Figure 9. Source (diode forward) current as a function of source-drain (diode forward) voltage; Typical values



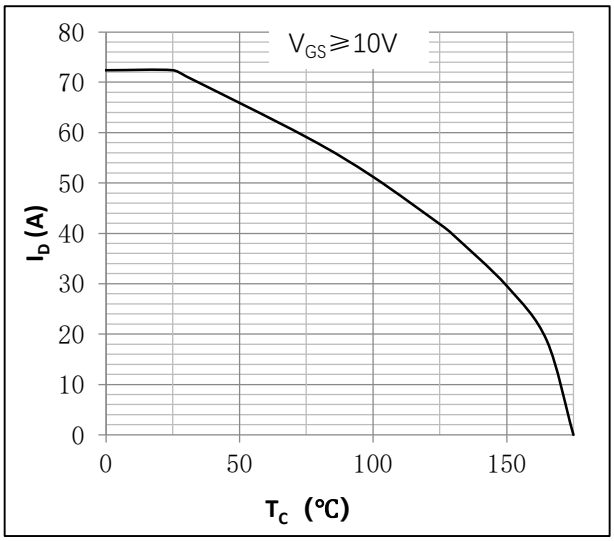
●Figure 10. Transfer characteristics: drain current as a function of gate-source voltage; Typical values



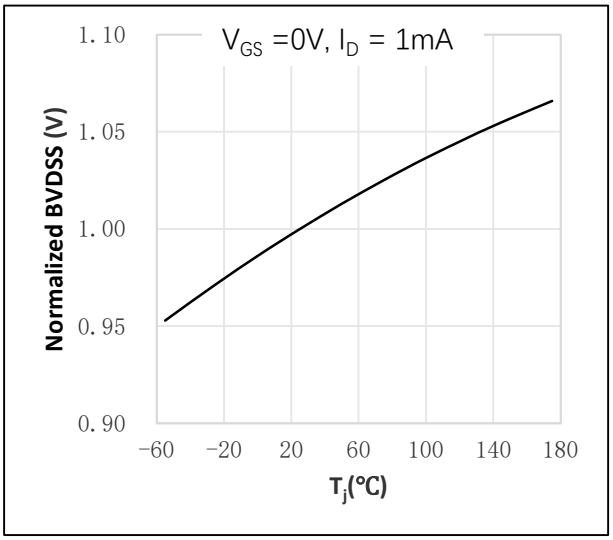
●Fig.11 Safe operating area: continuous and peak drain currents as a function of drain-source voltage; Calculative values



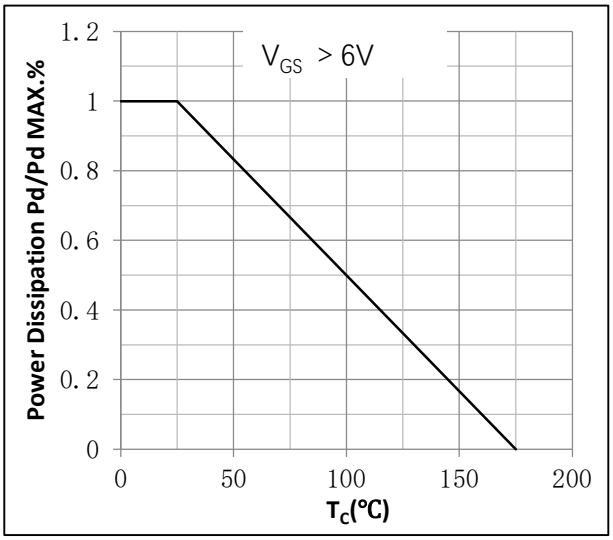
●Fig.12 Continuous drain current as a function of case temperature③;Calculative values



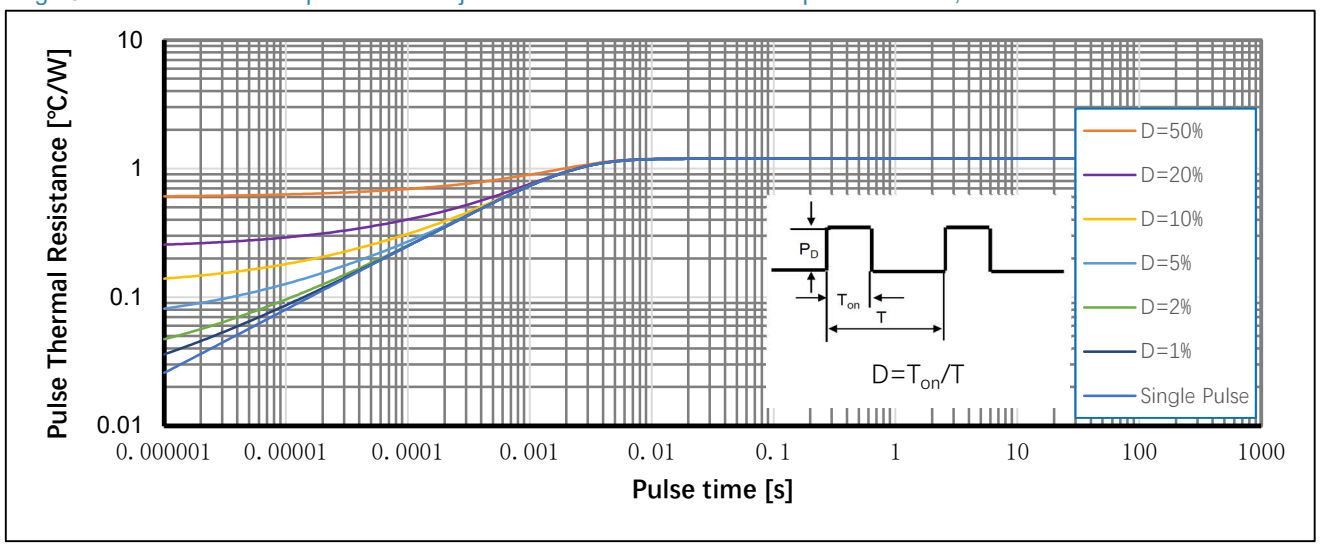
●Fig.13 Drain-source breakdown voltage as a function of junction temperature; Normalized values



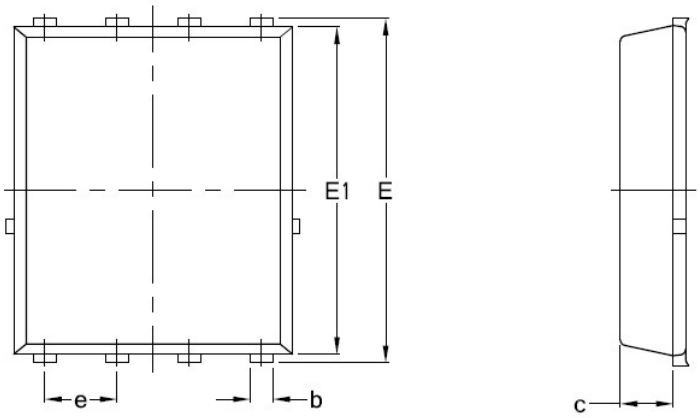
●Fig.14 Normalized total power dissipation as a function of case temperature; Calculative values Normalized Power Dissipation =P_d/P_d(25℃)

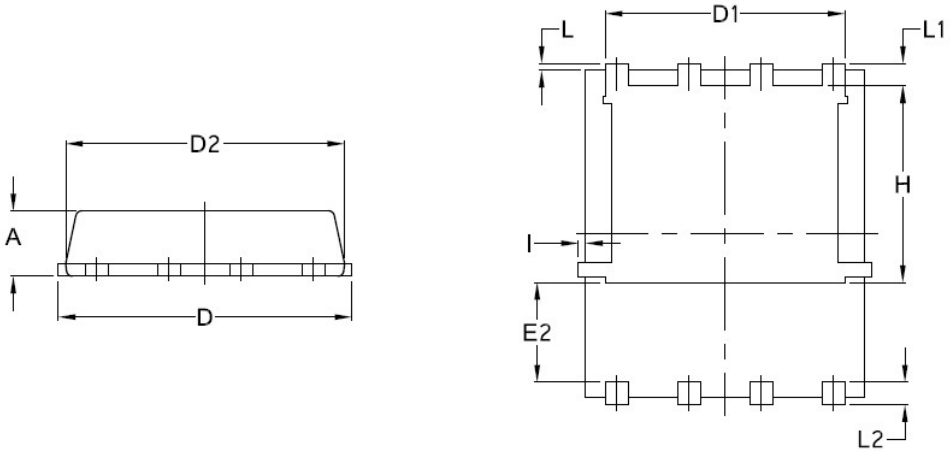


●Fig.15 Transient thermal impedance from junction to case as a function of pulse duration; max values



●Package Outline





	SYMBOL	COMMON			
		MM		INCH	
		MIN.	MAX.	MIN.	MAX.
	A	1.03	1.17	0.0406	0.0461
	b	0.34	0.48	0.0134	0.0189
	c	0.824	0.970	0.0324	0.0382
3	D	4.80	5.40	0.1890	0.2126
	D1	4.11	4.31	0.1618	0.1697
3	D2	4.80	5.00	0.1890	0.1969
	E	5.95	6.15	0.2343	0.2421
	E1	5.65	5.85	0.2224	0.2303
	E2	1.60	—	0.0630	—
	e	1.27 BSC		0.05 BSC	
3	L	0.05	0.25	0.0020	0.0098
	L1	0.38	0.50	0.0150	0.0197
	L2	0.38	0.50	0.0150	0.0197
4	H	3.30	3.50	0.1299	0.1378
	I	—	0.18	—	0.0070

●Note

① Pulse : V_{GS}=+20V/-20V, Duty cycle=50%,T_j=175℃, t=1000 hours; For DC， the following test conditions can be passed: V_{GS}=+20V/-10V, T_j=175℃, t=1000 hours;

② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;

③Practically the current will be limited by PCB, thermal design and operating temperature. V_{GS}=10V.

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●Revision History

Version	Date	Change
A	2021/3/15	New
B	2021/11/20	Add dynamic characteristics tf, tr, etc.
C	2022/9/2	1.Add Reach, HF figure; 2.ID modified.
D	2024/2/28	Correct package outline dimension.
E	2026/8/14	Apply new datasheet format.