

● General Description

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

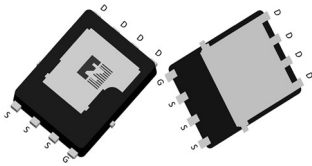
● Features

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

● Application

- BLDC motor driver
- DC-DC
- Load switch

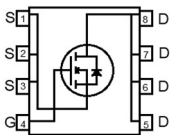
● Product Summary



DSCPPAK

● Ordering Information

Part NO.	ZMS009N06HNCP
Marking	ZMS009N06H
Packing information	REEL TAPE
Basic ordering unit (pcs)	3000



$V_{DS}=60V$

$R_{DS(ON)}=0.85mR$

$I_D=373A$



● Absolute Maximum Ratings ($T_A=25^\circ C$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Max.	Unit
Drain-source voltage	V_{DS}		-	60	V
Gate-source voltage ^①	V_{GS}		-20	20	V
Continuous drain current	I_D	$V_{GS}=10V, T_C=25^\circ C$	-	373	A
	I_D	$V_{GS}=10V, T_C=75^\circ C$	-	304	A
	I_D	$V_{GS}=10V, T_C=100^\circ C$	-	264	A
Pulsed drain current	I_{DM}	Pulsed; $t_p \leq 10 \mu s; T_C = 25^\circ C;$	-	1492	A
Total power dissipation	P_D	$T_C=25^\circ C$	-	273	W
Total power dissipation	P_D	$T_A=25^\circ C$	-	5	W
Operating junction temperature	T_J		-55	175	$^\circ C$
Storage temperature	T_{STG}		-55	175	$^\circ C$
Single pulse avalanche energy	E_{AS}	$L=0.1mH, V_{GS}=10V, R_g=25\Omega,$	-	387	mJ
		$L=0.5mH, V_{GS}=10V, R_g=25\Omega,$	-	697	mJ
ESD level (HBM)			CLASS 2		

● Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.55	°C/W
Thermal resistance, junction - ambient	$R_{thJA}^{①}$	-	-	30	°C/W
Soldering temperature	T_{sold}	-	-	260	°C

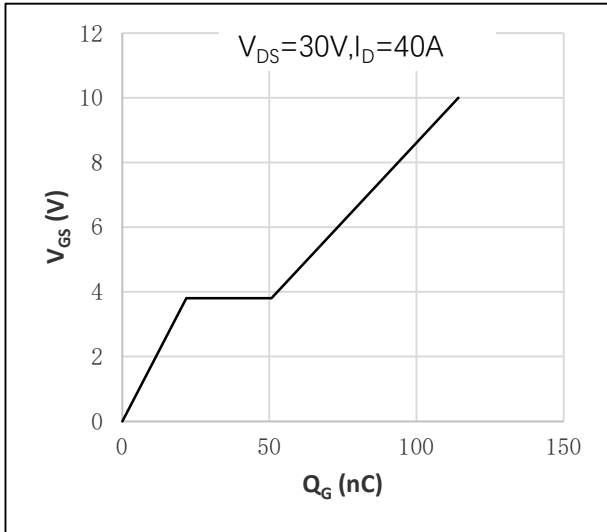
● Electronic Characteristics ($T_j=25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	2	2.7	4	V
Drain-source leakage current	I_{DSS}	$V_{GS}=0V, V_{DS}=60V$	-	-	1	μA
Gate- source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	100	nA
Static drain-source on resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=40A, T_j=25^{\circ}\text{C}$	-	0.85	1	m Ω
		$V_{GS}=10V, I_D=40A, T_j=175^{\circ}\text{C}$	-	1.63	-	m Ω
Forward transconductance	g_{FS}	$V_{DS}=5V, I_{SD}=10A$	-	29	-	S
Diode forward voltage	V_{FSD}	$V_{GS}=0V, I_{SD}=40A$	-	-	1.3	V

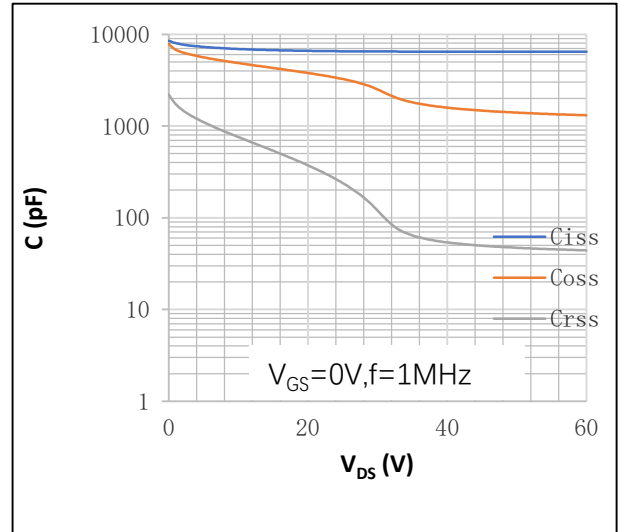
● Dynamic characteristics ($T_j=25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$f=1\text{MHz}, V_{DS}=30V, V_{GS}=0V$	-	6492	-	pF
Output capacitance	C_{oss}		-	2330	-	pF
Reverse transfer capacitance	C_{rss}		-	113	-	pF
Gate resistance	R_g	$f=1\text{MHz}$	-	1.5	-	Ω
Total gate charge	Q_g	$V_{DD}=30V, I_D=40A, V_{GS}=10V$	-	114.2	-	nC
Gate-source charge	Q_{gs}		-	21.9	-	nC
Gate-drain charge	Q_{gd}		-	28.9	-	nC
Turn-on delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=30V, R_G=3.3\Omega, I_D=40A$	-	23	-	ns
Turn-on rise time	t_r		-	112	-	ns
Turn-off delay time	$t_{D(off)}$		-	73	-	ns
Turn-off fall time	t_f		-	125	-	ns
Reverse recovery time	t_{rr}	$V_{DD}=40V, di/dt=100A/\mu s, I_S=40A$	-	69	-	ns
Reverse recovery charge	Q_{rr}		-	93	-	nC

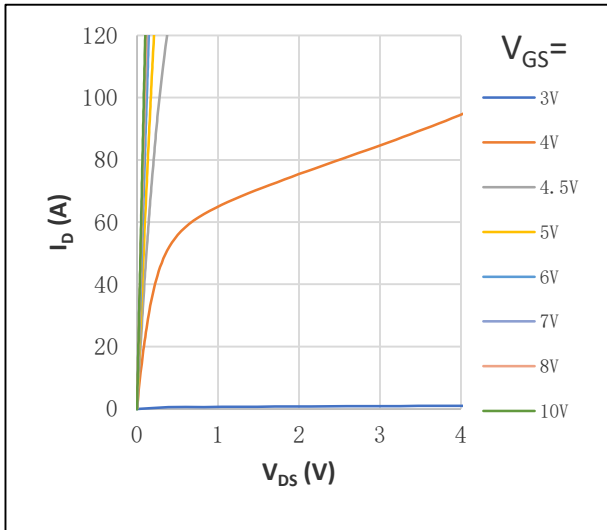
● Fig.1 Gate-source voltage as a function of gate charge; Typical values; $T_j=25^\circ\text{C}$



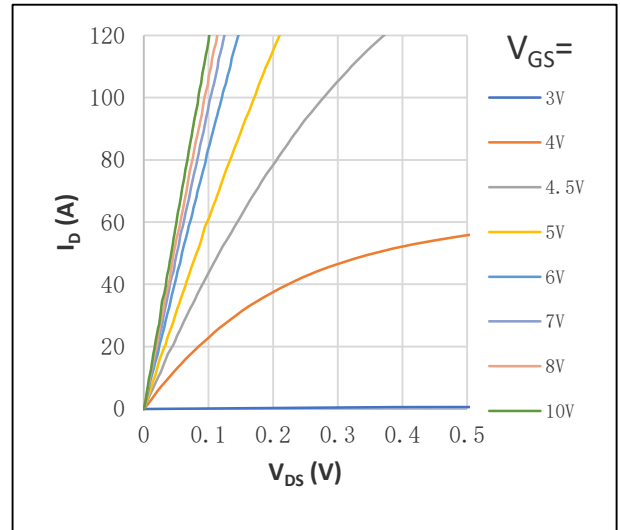
● Fig.2 Input, output and reverse transfer capacitances as a function of drain-source voltage; Typical values; $T_j=25^\circ\text{C}$



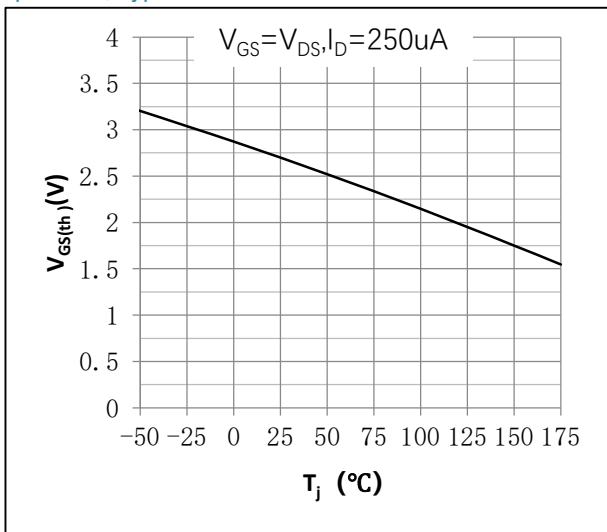
● Fig.3 Output characteristics: drain current as a function of drain-source voltage; Typical values; $T_j=25^\circ\text{C}$



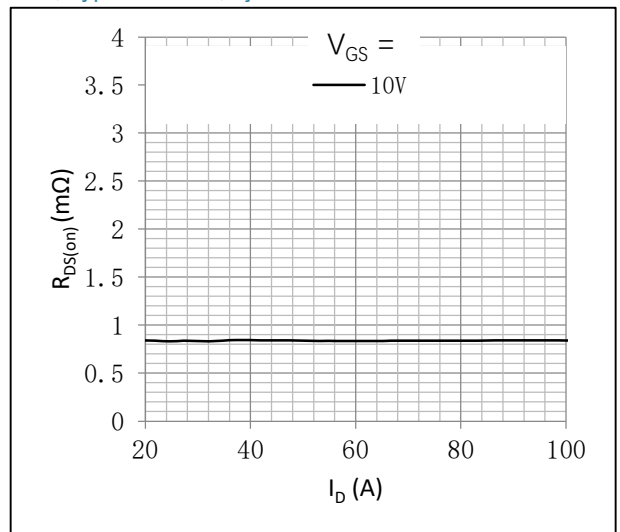
● Fig.4 Output characteristics: drain current as a function of drain-source voltage; Typical values: Expanded curve; $T_j=25^\circ\text{C}$



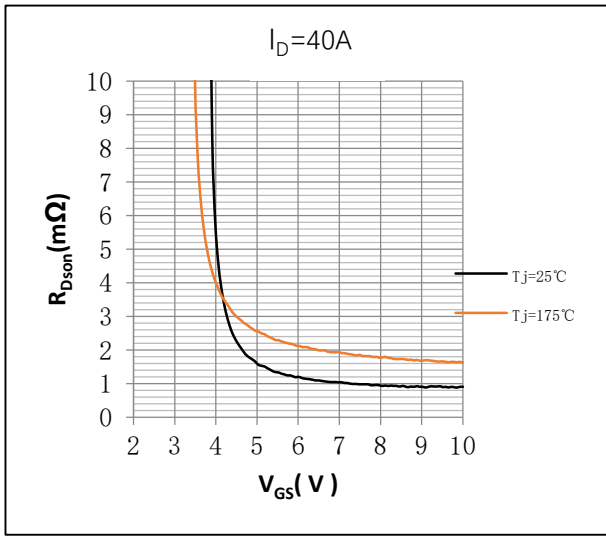
● Fig.5 Gate-source threshold voltage as a function of junction temperature; Typical values



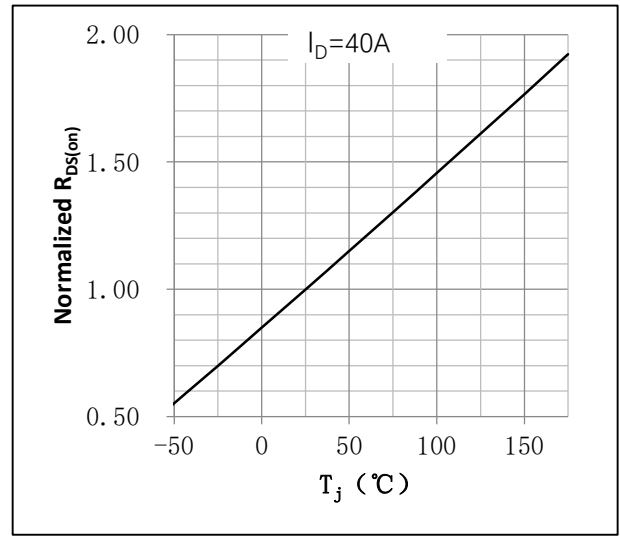
● Fig.6 Drain-source on-state resistance as a function of drain current; Typical values; $T_j=25^\circ\text{C}$



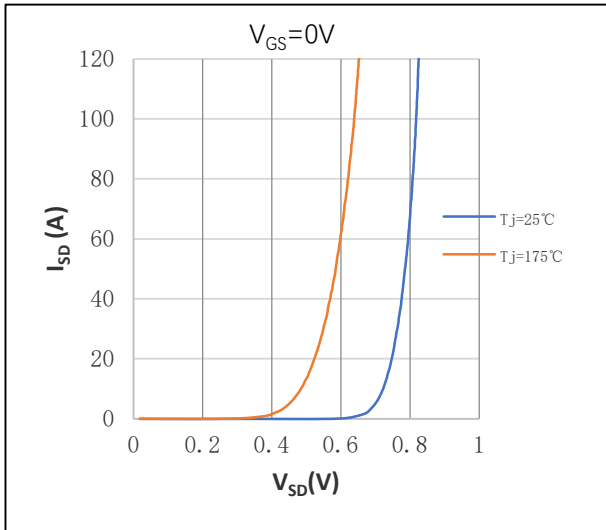
● Fig.7 Drain-source on-state resistance as a function of gate-source voltage; Typical values



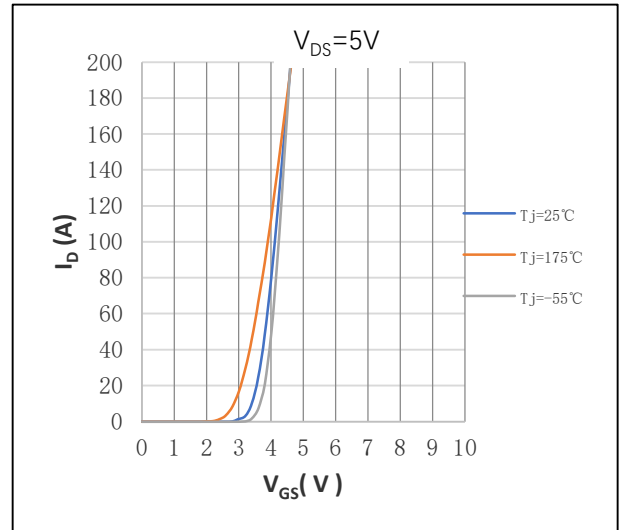
● Fig.8 Normalized drain-source on-state resistance factor as a function of junction temperature; Typical values Normalized On-Resistance = $R_{DS(on)}/R_{DS(on)}(25^{\circ}\text{C})$



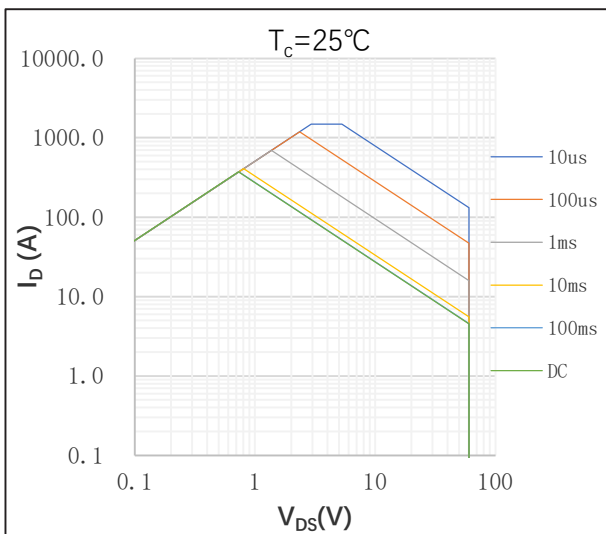
● Figure 9. Source (diode forward) current as a function of source-drain (diode forward) voltage; Typical values



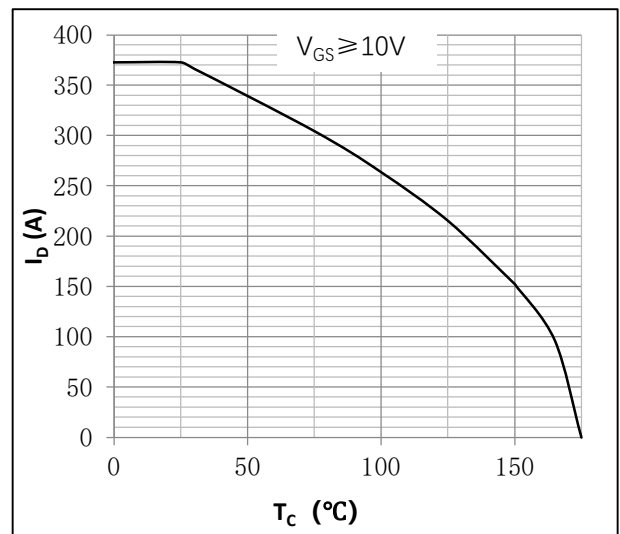
● Figure 10. Transfer characteristics: drain current as a function of gate-source voltage; Typical values



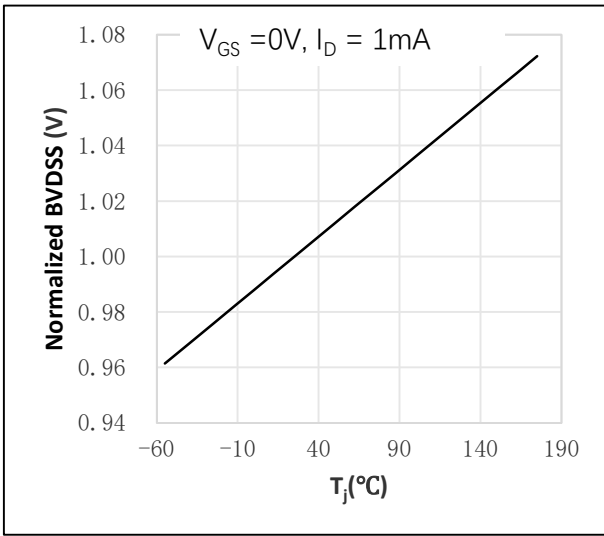
● Fig.11 Safe operating area: continuous and peak drain currents as a function of drain-source voltage; Calculative values



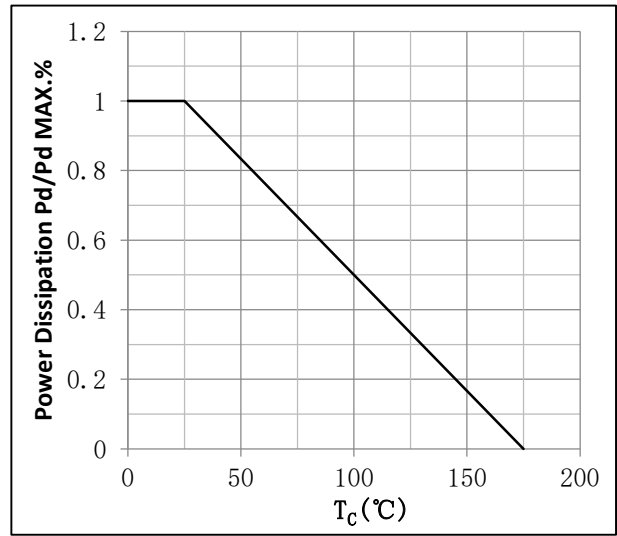
● Fig.12 Continuous drain current as a function of case temperature²; Calculative values



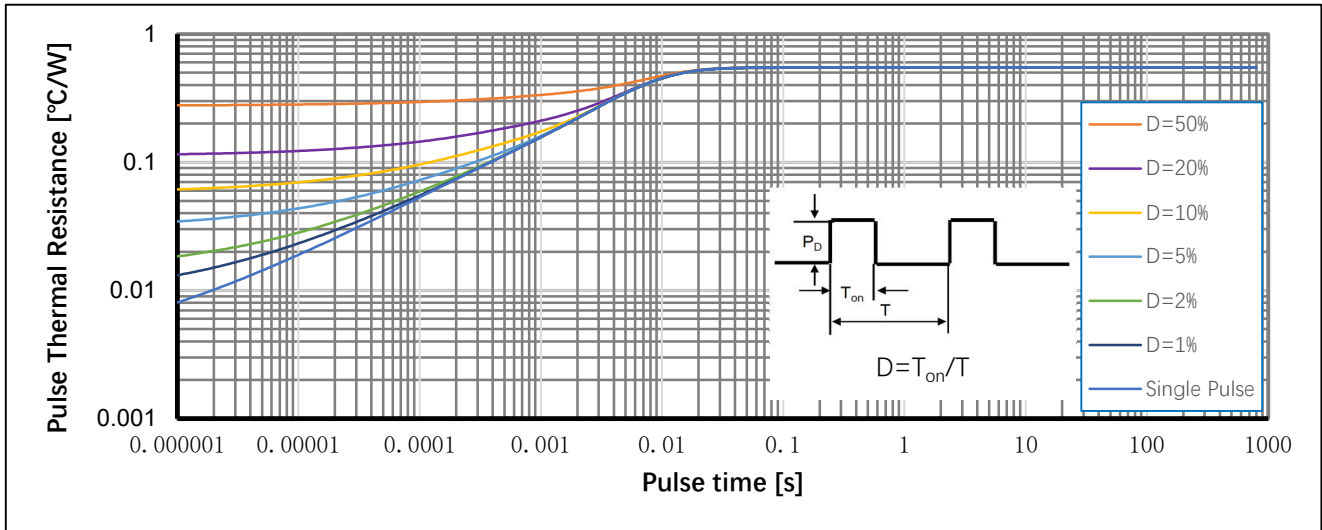
● Fig.13 Drain-source breakdown voltage as a function of junction temperature; Typical values Normalized $BV_{DSS} = BV_{DSS} / BV_{DSS}(25^{\circ}C)$



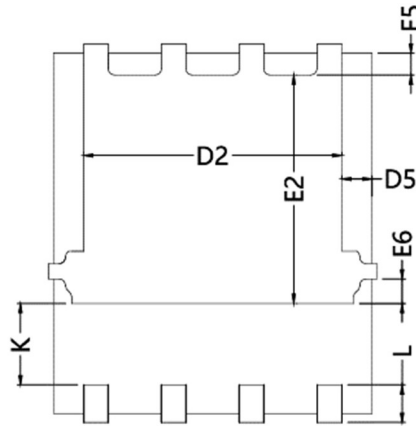
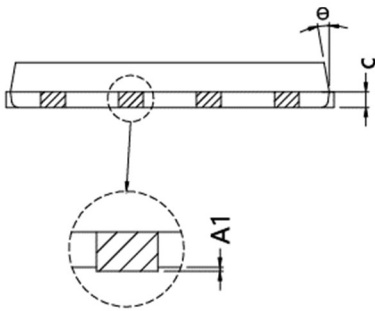
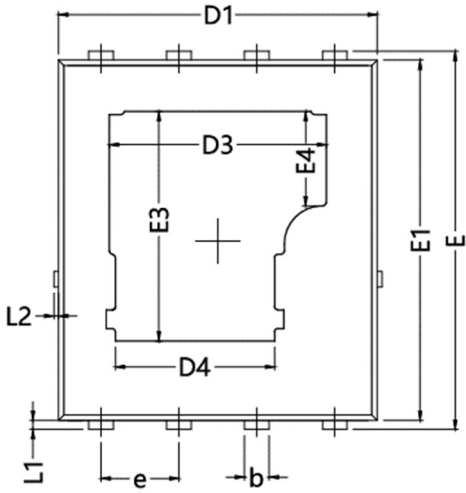
● Fig.14 Normalized total power dissipation as a function of case temperature; Calculative values Normalized Power Dissipation = $P_d / P_d(25^{\circ}C)$



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



● Package Outline



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.60	0.73	0.83
A1	0	---	0.05
b	0.30	0.40	0.50
c	0.20	0.25	0.30
D1	5.10	5.20	5.30
D2	4.06	4.21	4.36
D3	3.39	3.54	3.69
D4	2.445	2.595	2.745
D5	0.345	0.495	0.645
E	6.00	6.15	6.30
E1	5.76	5.86	5.96
E2	3.57	3.72	3.87
E3	3.588	3.738	3.888
E4	1.382	1.532	1.682
E5	0.205	0.355	0.505
E6	0.245	0.395	0.545
e	1.27 BSC		
L	0.50	0.61	0.71
L1	0.05	0.15	0.25
L2	0.02	0.08	0.15
K	1.10	---	---
θ	8°	10°	12°

● Note

- ① Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;
- ② Practically 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	2025/6/24	New