

● General Description

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

● Features

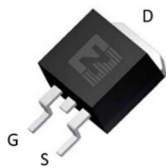
- Low $R_{DS(ON)}$ to minimize conductive loss
- Low Gate Charge for fast switching
- Low thermal resistance
- AEC-Q101 qualified

● Application

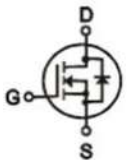
- BLDC motor driver
- DC-DC
- Load switch



● Product Summary



TO-263



$V_{DS}=40V$

$R_{DS(ON)}=2.5m\Omega$

$I_D=306A$



● Ordering Information

Part NO.	ZMPA030N04HB
Marking	ZMP030N04H
Packing information	REEL TAPE
Basic ordering unit (pcs)	800

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

Parameter	Symbol	Conditions	Min.	Max.	Unit
Drain-source voltage	V_{DS}	$25^\circ C \leq T_J \leq 175^\circ C$	-	40	V
Gate-source voltage ^①	V_{GS}	DC; $-55^\circ C \leq T_J \leq 175^\circ C$	-20	20	V
Continuous drain current	I_D	$V_{GS}=10V, T_C=25^\circ C$	-	306	A
	I_D	$V_{GS}=10V, T_C=75^\circ C$	-	250	A
	I_D	$V_{GS}=10V, T_C=100^\circ C$	-	216	A
Pulsed drain current	I_{DM}	Pulsed; $t_p \leq 10 \mu s; T_C = 25^\circ C$;	-	1224	A
Diode continuous current	I_S	$V_{GS}=0V, T_C=25^\circ C$	-	306	A
Diode pulse current	$I_{S,pulse}$	Pulsed; $t_p \leq 10 \mu s; T_C = 25^\circ C$;	-	1224	A
Total power dissipation	P_D	$V_{GS} > 6V, T_C=25^\circ C$	-	556	W
Total power dissipation	P_D	$V_{GS} > 6V, T_A=25^\circ C$	-	2.4	W
Operating junction temperature	T_J		-55	175	$^\circ C$
Storage temperature	T_{STG}		-55	175	$^\circ C$
Single pulse avalanche energy	E_{AS}	$L=0.5mH, V_{GS}=10V, R_g=25\Omega$	-	2034	mJ

ESD level (HBM)		CLASS 2
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● Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.27	°C/W
Thermal resistance, junction - ambient	$R_{thJA}^{②}$	-	-	62	°C/W
Soldering temperature	T_{sold}	-	-	260	°C

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

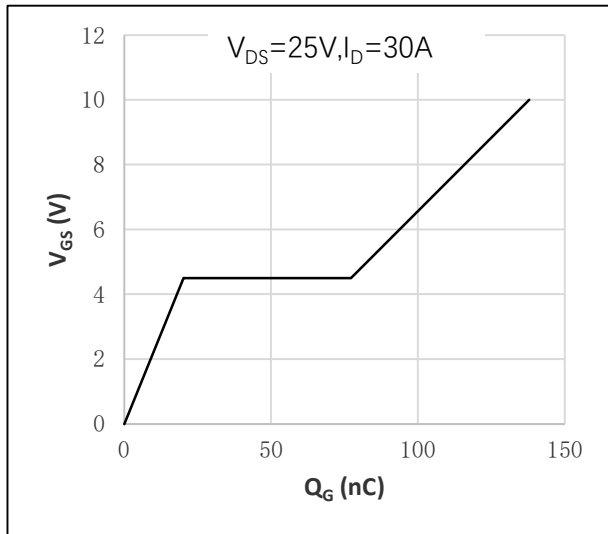
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A, T_j=25^{\circ}\text{C}$	40	-	-	V
		$V_{GS}=0V, I_D=1mA, T_j=-55^{\circ}\text{C}$	36.8	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A, T_j=25^{\circ}\text{C}$	2	2.7	4	V
		$V_{GS}=V_{DS}, I_D=1mA, T_j=-55^{\circ}\text{C}$	-	-	4.6	V
		$V_{GS}=V_{DS}, I_D=1mA, T_j=175^{\circ}\text{C}$	1.2	-	-	V
Drain-source leakage current	I_{DSS}	$V_{GS}=0V, V_{DS}=40V, T_j=25^{\circ}\text{C}$	-	-	1	μA
		$V_{GS}=0V, V_{DS}=40V, T_j=175^{\circ}\text{C}$	-	-	500	μA
Gate- source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
Static drain-source on resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A, T_j=25^{\circ}\text{C}$	-	2.5	3.1	m Ω
		$V_{GS}=10V, I_D=30A, T_j=175^{\circ}\text{C}$	-	4.8	-	m Ω
Forward transconductance	g_{FS}	$V_{DS}=5V, I_{SD}=10A$	-	27	-	S
Diode forward voltage	V_{FSD}	$V_{GS}=0V, I_{SD}=30A$	-	0.8	1.3	V

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

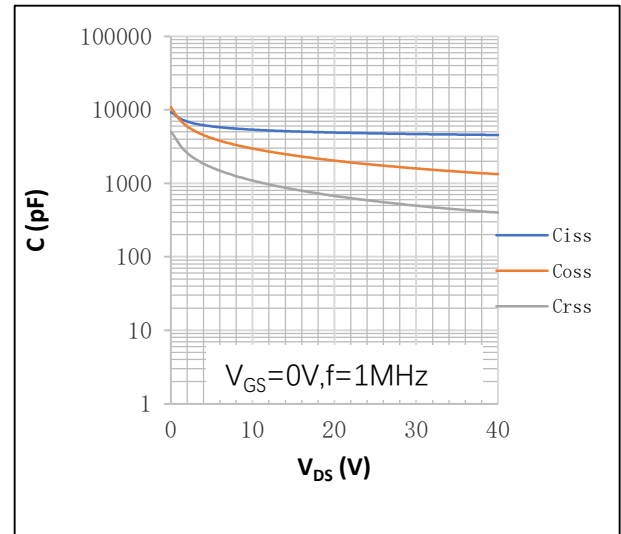
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$f=1\text{MHz}, V_{DS}=25V, V_{GS}=0V$	-	4797	-	pF
Output capacitance	C_{oss}		-	1788	-	pF
Reverse transfer capacitance	C_{rss}		-	573	-	pF
Gate resistance	R_g	$f=1\text{MHz}$	-	1.9	-	Ω
Total gate charge	Q_g	$V_{DD}=25V, I_D=30A, V_{GS}=10V$	-	137.9	-	nC
Gate-source charge	Q_{gs}		-	20.3	-	nC
Gate-drain charge	Q_{gd}		-	56.9	-	nC
Turn-on delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=25V,$	-	22	-	ns
Turn-on rise time	t_r	$R_G=3.3\Omega, I_D=30A$	-	6	-	ns

Turn-off delay time	$t_{D(off)}$		-	32	-	ns
Turn-off fall time	t_f		-	7	-	ns
Reverse recovery time	t_{rr}	$V_{DD}=25V, dI_S/dt = 100A/us,$ $I_S=30A$	-	29	-	ns
Reverse recovery charge	Q_{rr}		-	52	-	nC

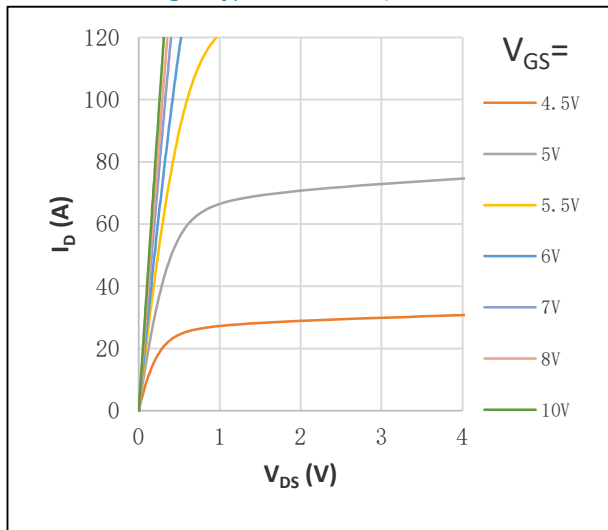
● Fig.1 Gate-source voltage as a function of gate charge; Typical values; $T_j=25^\circ\text{C}$



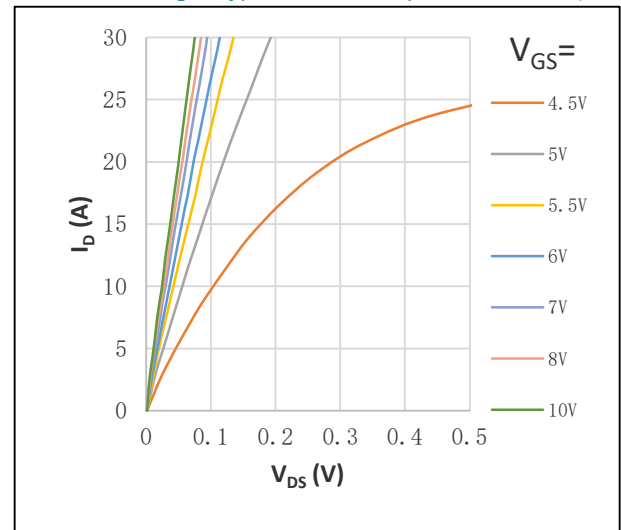
● Fig.2 Input, output and reverse transfer capacitances as a function of drain-source voltage; Typical values; $T_j=25^\circ\text{C}$



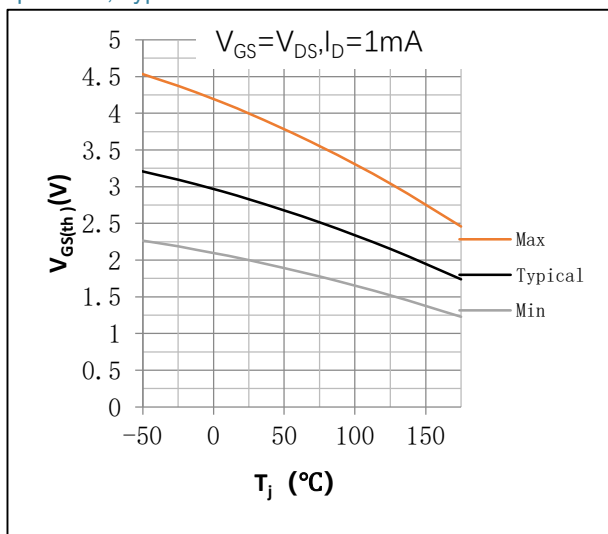
● Fig.3 Output characteristics: drain current as a function of drain-source voltage; Typical values; $T_j=25^\circ\text{C}$



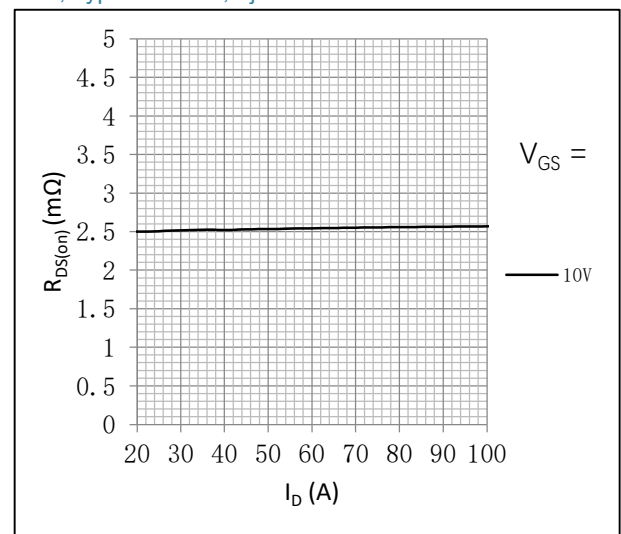
● Fig.4 Output characteristics: drain current as a function of drain-source voltage; Typical values: Expanded curve; $T_j=25^\circ\text{C}$



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

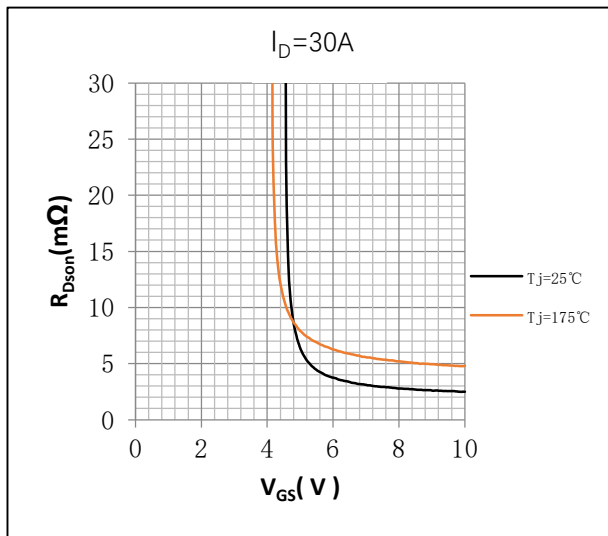


● Fig.6 Drain-source on-state resistance as a function of drain current; Typical values; $T_j=25^\circ\text{C}$

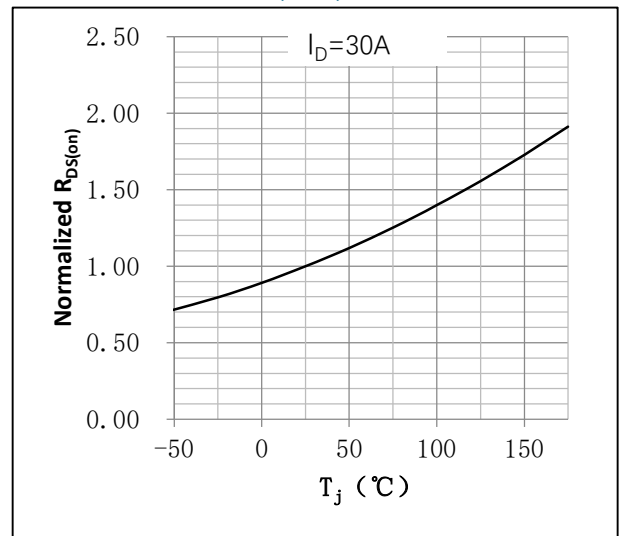


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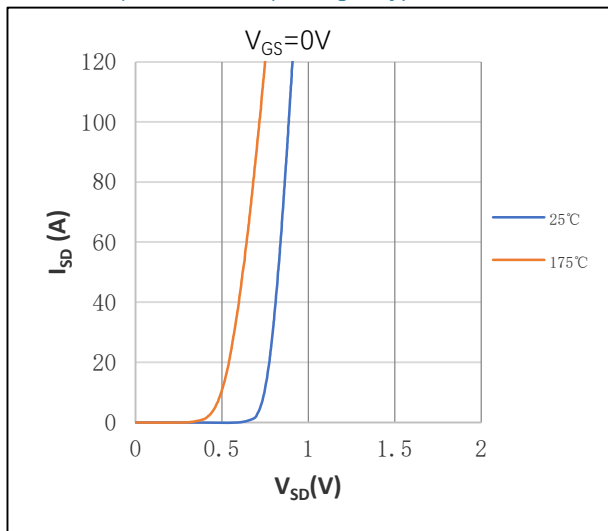
● Fig.7 Drain-source on-state resistance as a function of gate-source voltage; Typical values



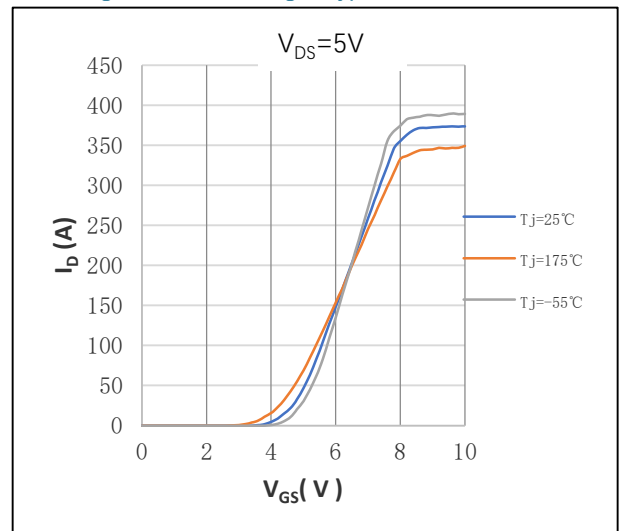
● Fig.8 Normalized drain-source on-state resistance factor as a function of junction temperature; Typical values Normalized On-Resistance = $R_{DS(on)}/R_{DS(on)}(25^{\circ}\text{C})$



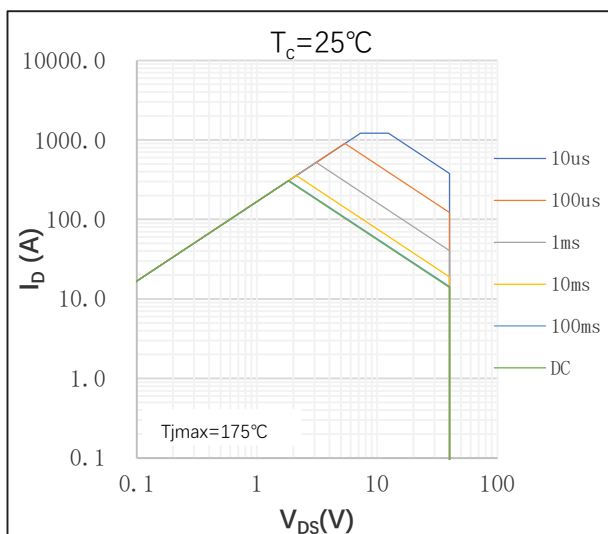
● Figure 9. Source (diode forward) current as a function of source-drain (diode forward) voltage; Typical values



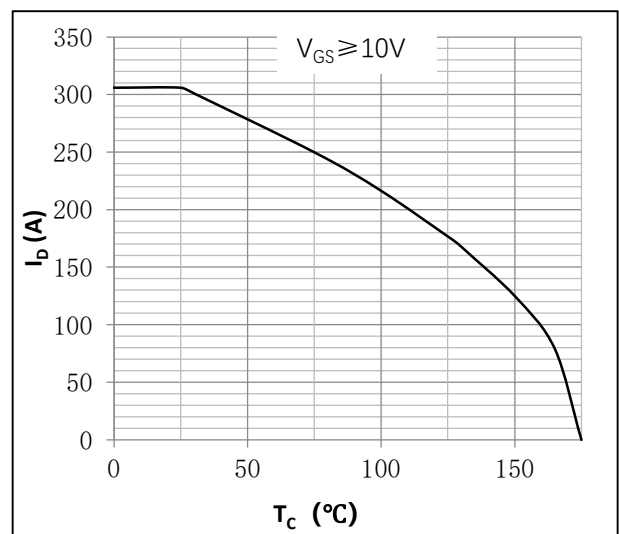
● Figure 10. Transfer characteristics: drain current as a function of gate-source voltage; Typical values



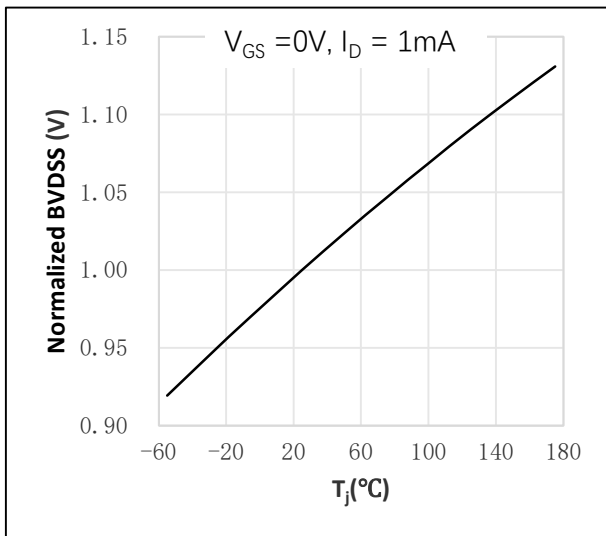
● Fig.11 Safe operating area: continuous and peak drain currents as a function of drain-source voltage; Calculative values



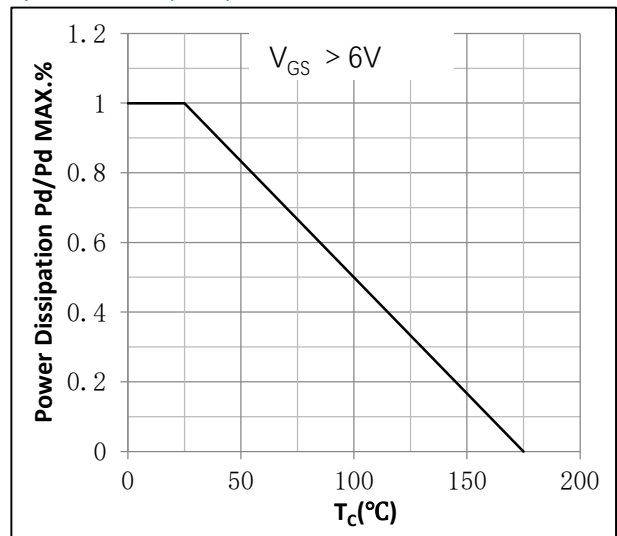
● Fig.12 Continuous drain current as a function of case temperature³; Calculative values



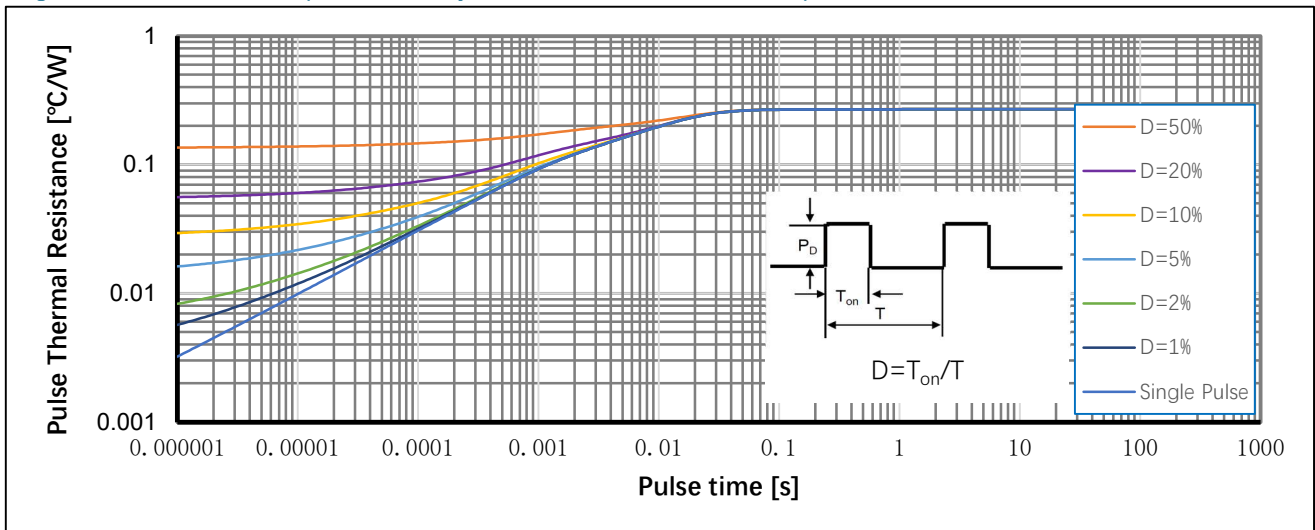
● Fig.13 Drain-source breakdown voltage as a function of junction temperature; Min values



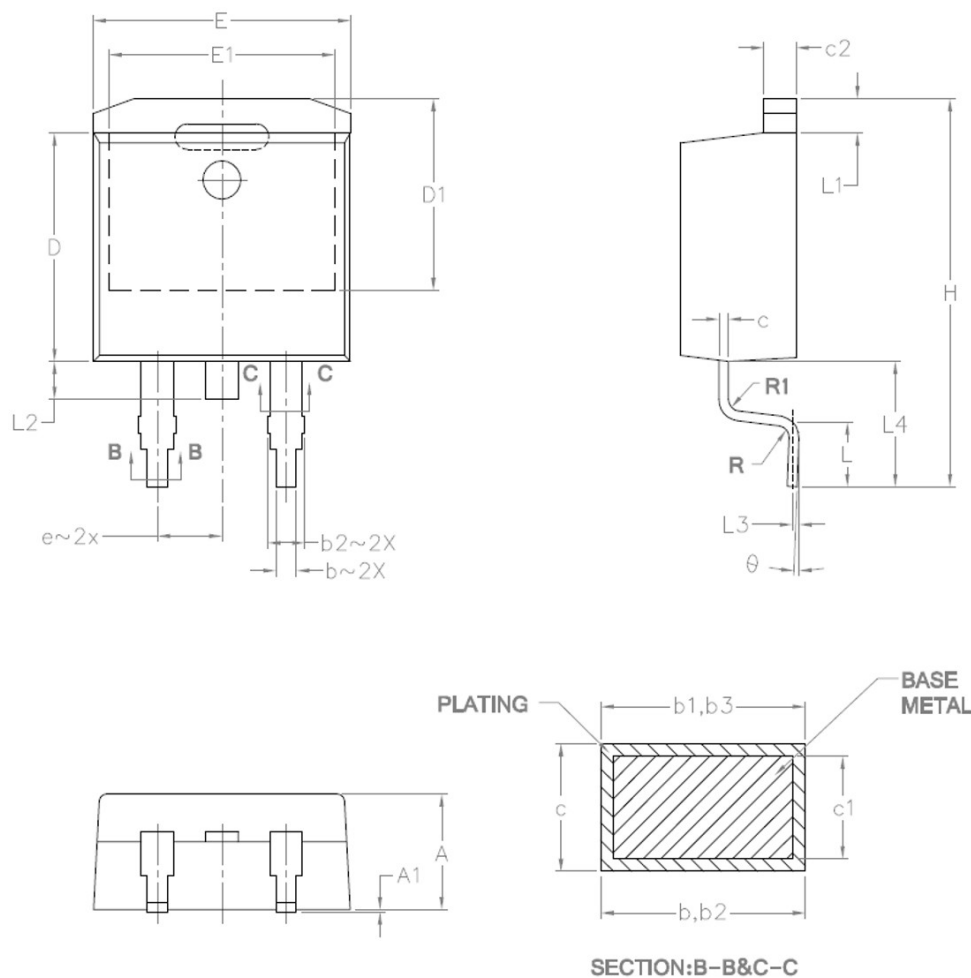
● Fig.14 Normalized total power dissipation as a function of case temperature; Calculative values Normalized Power Dissipation = $P_d/P_d(25^\circ C)$



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



● Package Outline



SYMBOLS	COMMON			
	MM		INCH	
	MIN.	MAX.	MIN.	MAX.
A	4.064	4.826	0.160	0.190
A1	0.000	0.254	0.000	0.010
b	0.508	0.991	0.020	0.039
b1	0.508	0.889	0.020	0.035
b2	1.143	1.778	0.045	0.070
b3	1.143	1.727	0.045	0.068
c	0.381	0.737	0.015	0.029
c1	0.381	0.584	0.015	0.023
c2	1.143	1.651	0.045	0.065
D	8.382	9.652	0.330	0.380
D1	6.858	—	0.270	—
E	9.652	10.668	0.380	0.420
E1	6.223	—	0.245	—
e	2.490	2.590	0.098	0.102
H	14.605	15.875	0.575	0.625
L	1.778	2.794	0.070	0.110
L1	—	1.676	—	0.066
L2	—	1.778	—	0.070
L3	0.00	0.254	0.00	0.010
L4	4.780	5.280	0.188	0.208
R	0.460 TYP		0.018 TYP	
R1	0.460 TYP		0.018 TYP	
θ	0°	8°	0°	8°

● Note

- ① Pulse : $V_{GS}=+20V/-20V$, Duty cycle=50%, $T_j=175^{\circ}C$, $t=1000$ hours; For DC, the following test conditions can be passed: $V_{GS}=+20V/-10V$, $T_j=175^{\circ}C$, $t=1000$ hours;
- ② Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate;
- ③ 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
Preliminary	2026/7/22	New