

● General Description

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

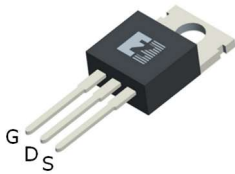
● Features

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

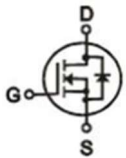
● Application

- BLDC motor driver
- DC-DC
- Load switch

● Product Summary



TO-220



$V_{DS}=100V$

$R_{DS(ON)}=2mR$

$I_D=180A$



● Ordering Information

Part NO.	ZMS015N10HP
Marking	ZMS015N10H
Packing information	TUBE
Basic ordering unit (pcs)	1000

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

Parameter	Symbol	Conditions	Min.	Max.	Unit
Drain-source voltage	V_{DS}		-	100	V
Gate-source voltage	V_{GS}		-20	20	V
Continuous drain current	I_D	$V_{GS}=10V, T_C=25^{\circ}C$	-	180	A
	I_D	$V_{GS}=10V, T_C=75^{\circ}C$	-	180	A
	I_D	$V_{GS}=10V, T_C=100^{\circ}C$	-	180	A
Pulsed drain current	I_{DM}	Pulsed; $t_p \leq 10 \mu s; T_C = 25^{\circ}C$;	-	720	A
Diode continuous current	I_S	$V_{GS}=0V, T_C=25^{\circ}C$	-	180	A
Diode pulse current	$I_{S,pulse}$	$V_{GS}=0V$, Pulsed, $t_p \leq 10 \mu s, T_C = 25^{\circ}C$	-	720	A
Total power dissipation	P_D	$T_C=25^{\circ}C$	-	375	W
Total power dissipation	P_D	$T_A=25^{\circ}C$	-	3.1	W
Operating junction temperature	T_J		-55	175	$^{\circ}C$
Storage temperature	T_{STG}		-55	175	$^{\circ}C$
Single pulse avalanche energy	E_{AS}	$L=0.1mH, V_{GS}=10V, R_g=25\Omega$,	-	500	mJ
		$L=0.5mH, V_{GS}=10V, R_g=25\Omega$,	-	900	mJ

ESD level (HBM)		CLASS 2
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● Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.4	°C/W
Thermal resistance, junction - ambient	R_{thJA}^{\circledast}	-	-	62	°C/W
Soldering temperature	T_{sold}	-	-	260	°C

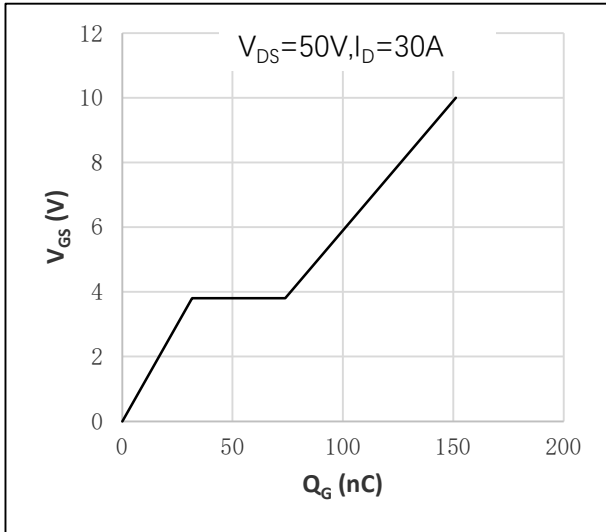
● Electronic Characteristics ($T_j=25^{\circ}C$, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	-	-	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}	$V_{GS}=0V, V_{DS}=100V$	-	-	1	μA
Gate- source leakage current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	100	nA
Static drain-source on resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=30A, T_j=25^{\circ}C$	-	2	2.4	m Ω
		$V_{GS}=10V, I_D=30A, T_j=175^{\circ}C$	-	3.8	-	m Ω
Forward transconductance	g_{FS}	$V_{DS}=5V, I_{SD}=10A$	-	41	-	S
Diode forward voltage	V_{FSD}	$V_{GS}=0V, I_{SD}=30A$	-	-	1.3	V

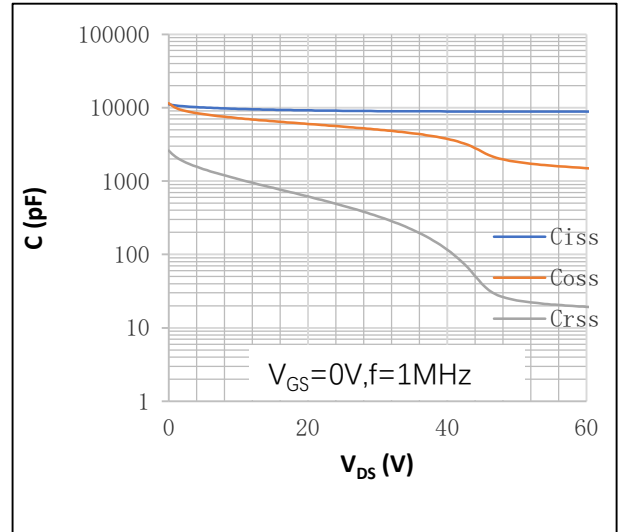
● Dynamic characteristics ($T_j=25^{\circ}C$, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	$f=1MHz, V_{DS}=50V, V_{GS}=0V$	-	8906	-	pF
Output capacitance	C_{oss}		-	1884	-	pF
Reverse transfer capacitance	C_{rss}		-	31	-	pF
Gate resistance	R_g	$f=1MHz$	-	0.9	-	Ω
Total gate charge	Q_g	$V_{DD}=50V, I_D=30A, V_{GS}=10V$	-	151.2	-	nC
Gate-source charge	Q_{gs}		-	31.8	-	nC
Gate-drain charge	Q_{gd}		-	42.2	-	nC
Turn-on delay time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=50V, R_G=3.3\Omega, I_D=30A$	-	20	-	ns
Turn-on rise time	t_r		-	11	-	ns
Turn-off delay time	$t_{D(off)}$		-	48	-	ns
Turn-off fall time	t_f		-	38	-	ns
Reverse recovery time	t_{rr}		$V_{DD}=50V, di/dt=100A/\mu s, I_S=30A$	-	78	-
Reverse recovery charge	Q_{rr}		-	175	-	nC

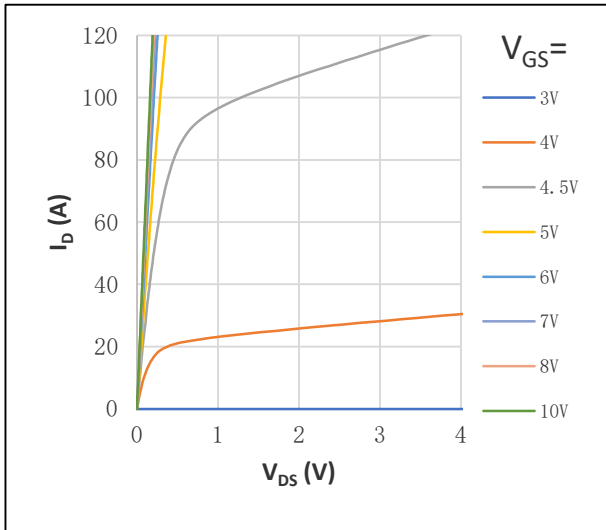
● Fig.1 Gate-source voltage as a function of gate charge; Typical values; $T_j=25^\circ\text{C}$



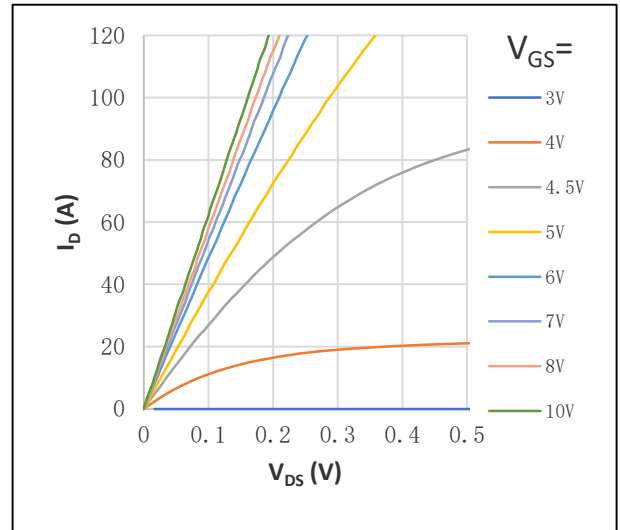
● Fig.2 Input, output and reverse transfer capacitances as a function of drain-source voltage; Typical values; $T_j=25^\circ\text{C}$



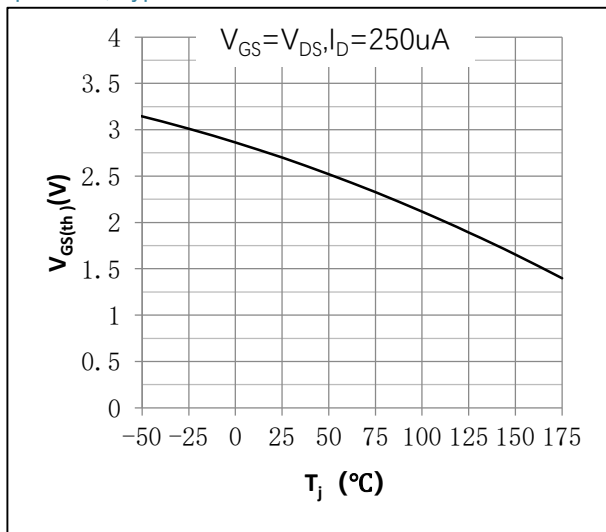
● Fig.3 Output characteristics: drain current as a function of drain-source voltage; Typical values; $T_j=25^\circ\text{C}$



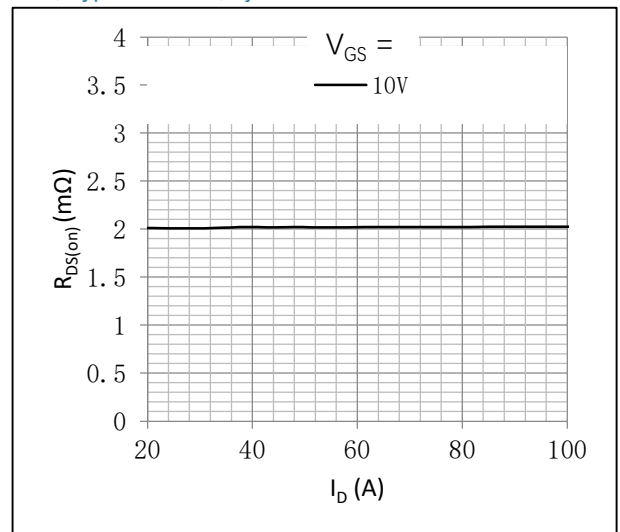
● Fig.4 Output characteristics: drain current as a function of drain-source voltage; Typical values: Expanded curve; $T_j=25^\circ\text{C}$



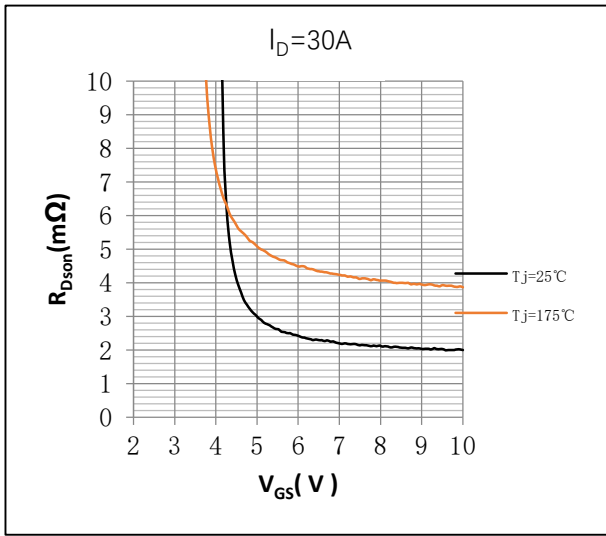
● Fig.5 Gate-source threshold voltage as a function of junction temperature; Typical values



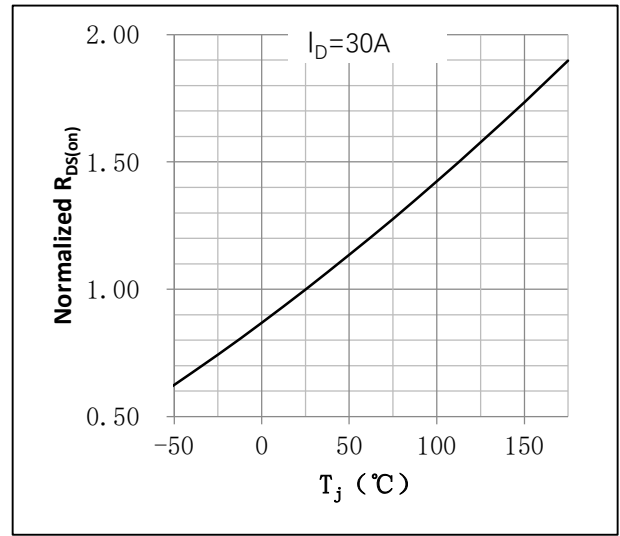
● Fig.6 Drain-source on-state resistance as a function of drain current; Typical values; $T_j=25^\circ\text{C}$



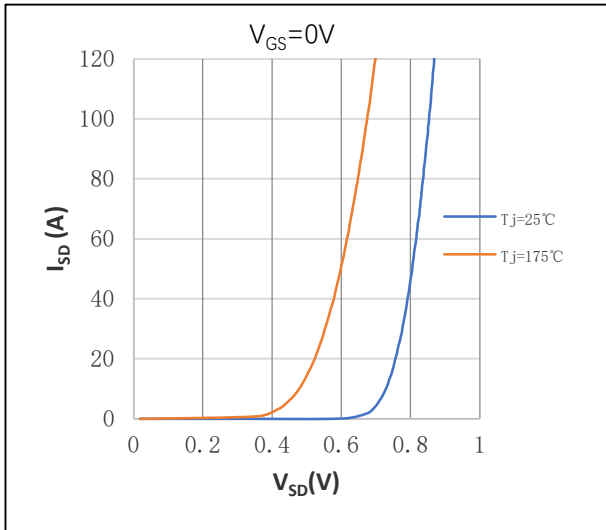
● Fig.7 Drain-source on-state resistance as a function of gate-source voltage; Typical values



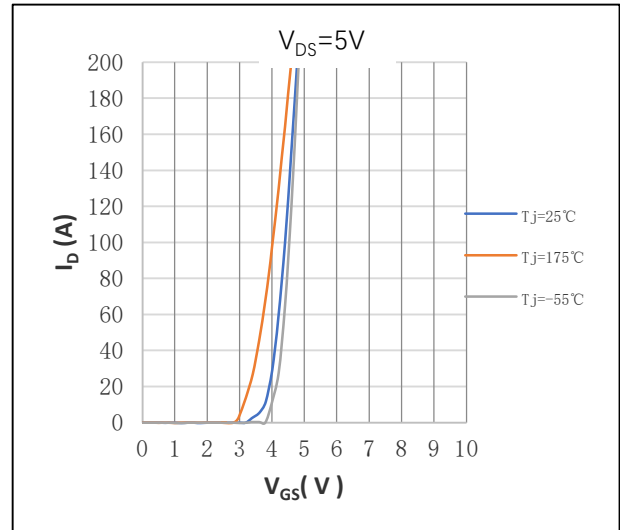
● Fig.8 Normalized drain-source on-state resistance factor as a function of junction temperature; Typical values Normalized On-Resistance = $R_{DS(on)}/R_{DS(on)}(25^{\circ}\text{C})$



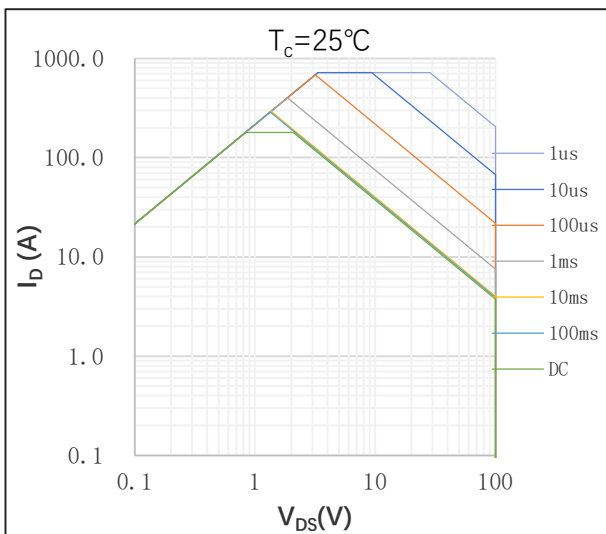
● Figure 9. Source (diode forward) current as a function of source-drain (diode forward) voltage; Typical values



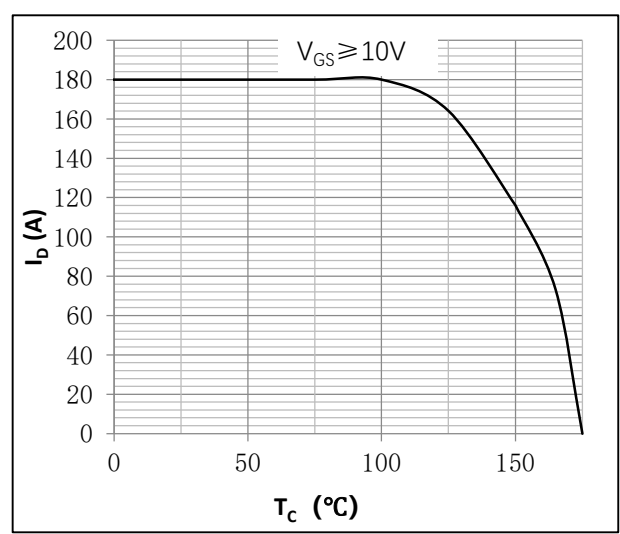
● Figure 10. Transfer characteristics: drain current as a function of gate-source voltage; Typical values



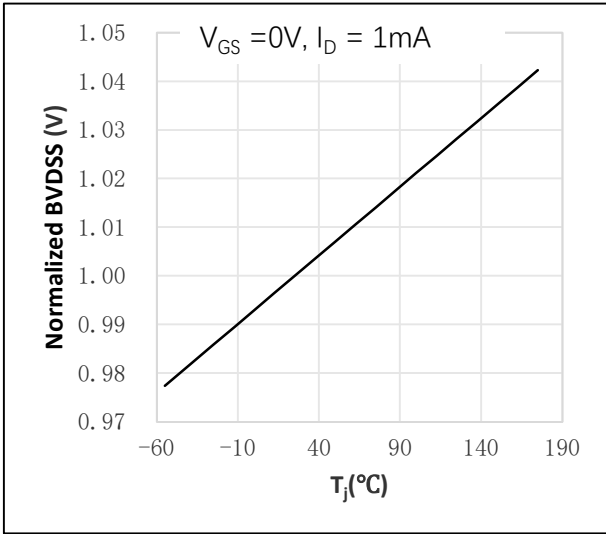
● Fig.11 Safe operating area: continuous and peak drain currents as a function of drain-source voltage; Calculative values



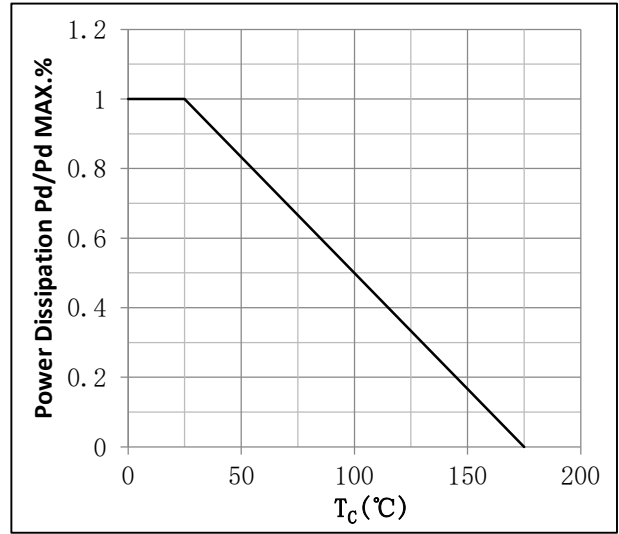
● Fig.12 Continuous drain current as a function of case temperature³; Calculative values



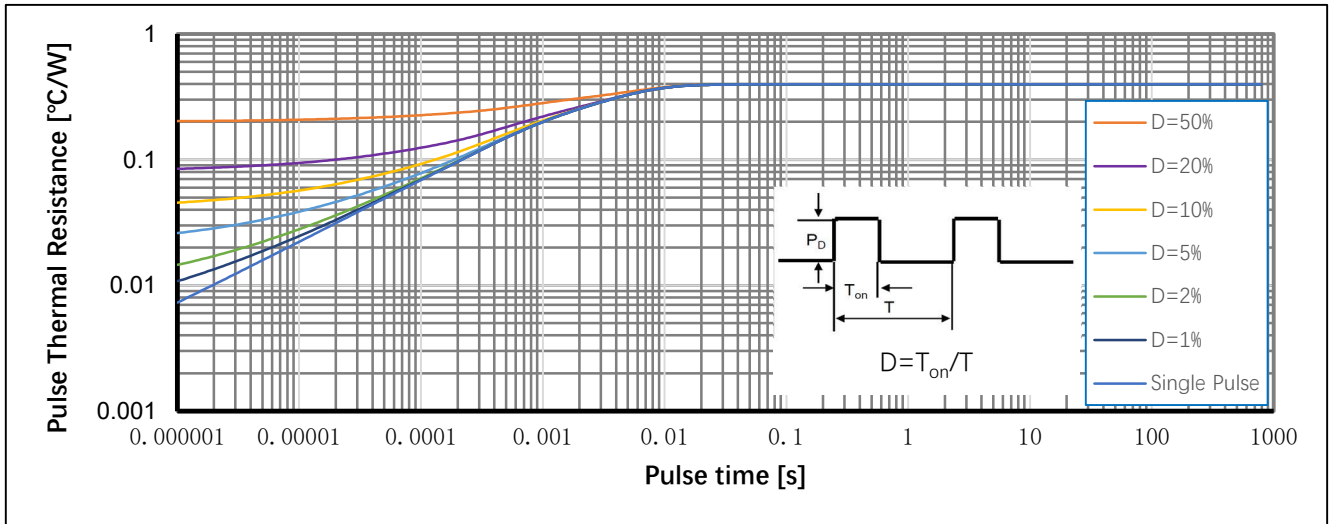
● Fig.13 Drain-source breakdown voltage as a function of junction temperature; Typical values Normalized $BV_{DSS} = BV_{DSS}/BV_{DSS}(25^{\circ}C)$



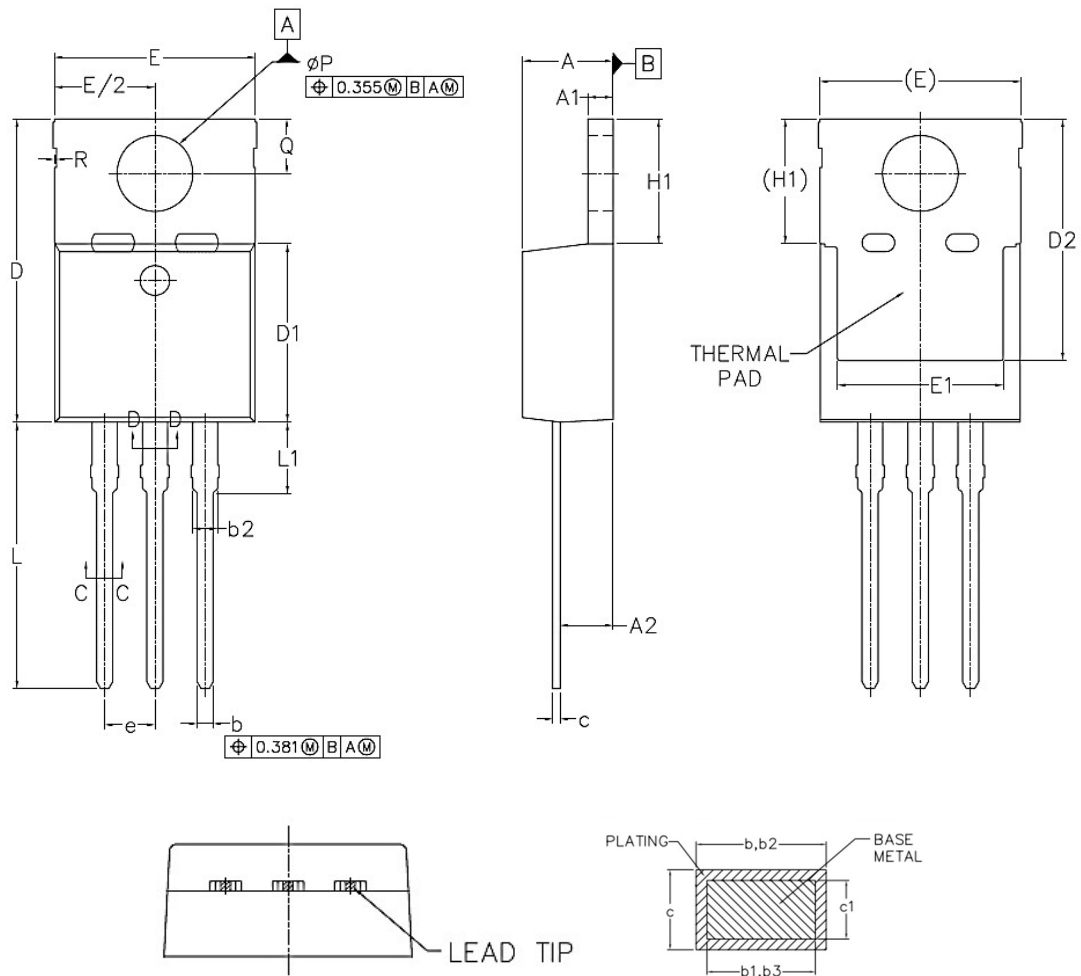
● Fig.14 Normalized total power dissipation as a function of case temperature; Calculative values Normalized Power Dissipation $= P_d/P_d(25^{\circ}C)$



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



● Package Outline



SYMBOL	COMMON	
	MM	
	MIN.	MAX.
A	3.556	4.826
A1	0.508	1.397
A2	2.032	2.921
b	0.381	1.016
b1	0.381	0.965
b2	1.143	1.778
b3	1.143	1.727
c	0.356	0.610
c1	0.356	0.559
D	14.224	16.510
D1	8.382	9.017
D2	12.042	12.878
E	9.652	10.668
E1	6.858	8.890
e	2.540 BSC.	
H1	5.842	6.858
L	12.700	14.732
L1	3.560	4.060
∅P	3.810	3.860
Q	2.540	3.048
R	0.127 BSC	

● 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	2024/4/28	New
B	2025/10/30	Apply new datasheet format.