General Description

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

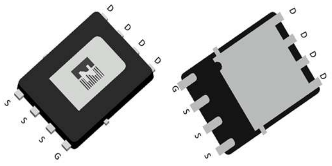
Features

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

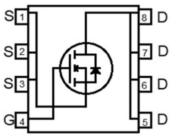
Application

- BLDC motor driver
- DC-DC
- Load switch

Product Summary



DSCQFN5*6



V_{DS}=100V

$R_{DS(ON)}$ =2.6mR

I_D=166A

RoHS REACH HF

Ordering Information

Part NO.	ZMSA026N10HNCD
Marking	ZMS026N10H
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}		-	100	V
Gate-source voltage①	V_{GS}		-20	20	V
Continuous drain current	I_D	V_{GS}=10V, T_C=25℃	-	166	A
	I_D	V_{GS}=10V, T_C=75℃	-	135	A
	I_D	V_{GS}=10V, T_C=100℃	-	117	A
Pulsed drain current	I_{DM}	Pulsed; t_p ≤ 10 μs; T_C = 25 °C;	-	664	A
Diode continuous current	I_S	V_{GS}=0V, T_C=25℃	-	135	A
Diode pulse current	$I_{S,pulse}$	V_{GS}=0V, Pulsed, t_p ≤ 10 μs, T_C = 25 °C	-	540	A
Total power dissipation	P_D	T_C=25℃	-	176	W
Total power dissipation	P_D	T_A=25℃	-	3.3	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,	-	289	mJ

		L=0.5mH, V_{GS}=10V, R_g=25Ω,	-	520	mJ
ESD level (HBM)			CLASS 2		

●Thermal resistance

Parameter	Symbol	Min.	Typ.	Max.	Unit
Thermal resistance, junction - case	R_{thJC}	-	-	0.85	°C/W
Thermal resistance, junction - ambient	R_{thJA} ②	-	-	45	°C/W
Soldering temperature	T_{sold}	-	-	260	°C

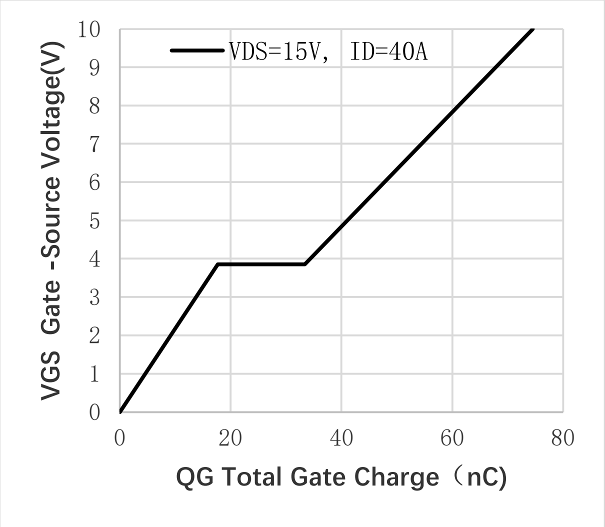
●Electronic Characteristics (T_j=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	V_{GS} =0V, I_D =250uA	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	2	2.7	4	V
Drain-source leakage current	I_{DSS}	V_{GS}=0V, V_{DS}=100V	-	-	1	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=40A, T_j=25℃	-	2.6	3.2	mΩ
Forward transconductance	g_{FS}	V_{DS} =5V, I_{SD} = 5A	-	26	-	S
Diode forward voltage	V_{FSD}	V_{GS} =0V, I_{SD} = 40A	-	-	1.3	V

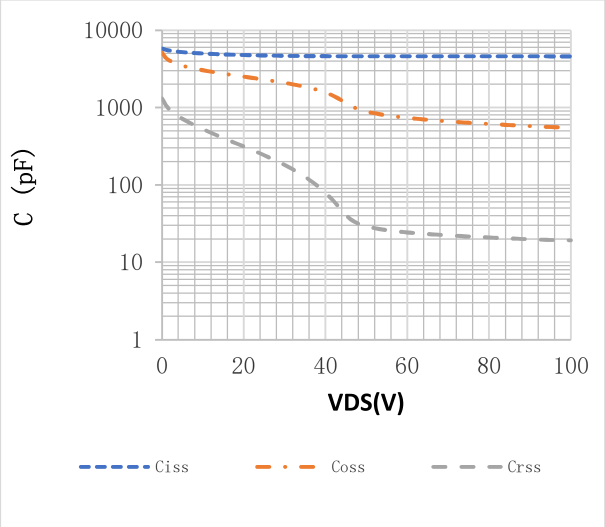
●Dynamic characteristics (T_j=25°C, unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Input capacitance	C_{iss}	f = 1MHz, V_{DS}=25V, V_{GS}=0V	-	4758	-	pF
Output capacitance	C_{oss}		-	2270	-	pF
Reverse transfer capacitance	C_{rss}		-	244	-	pF
Gate resistance	R_g	f = 1MHz	-	0.7	-	Ω
Total gate charge	Q_g	V_{DD} = 15V, I_D = 40A, V_{GS} = 10V	-	74.5	-	nC
Gate-source charge	Q_{gs}		-	17.7	-	nC
Gate-drain charge	Q_{gd}		-	15.7	-	nC
Turn-on delay time	$t_{D(on)}$	V_{GS}=10V, V_{DS}=15V, R_G =3.3Ω, I_D =20A	-	20	-	ns
Turn-on rise time	t_r		-	10	-	ns
Turn-off delay time	$t_{D(off)}$		-	32	-	ns
Turn-off fall time	t_f		-	21	-	ns
Reverse recovery time	t_{rr}	V_{DD}=20V, dI_S/dt = 100A/us, I_S=20A	-	75	-	ns
Reverse recovery charge	Q_{rr}		-	112	-	nC

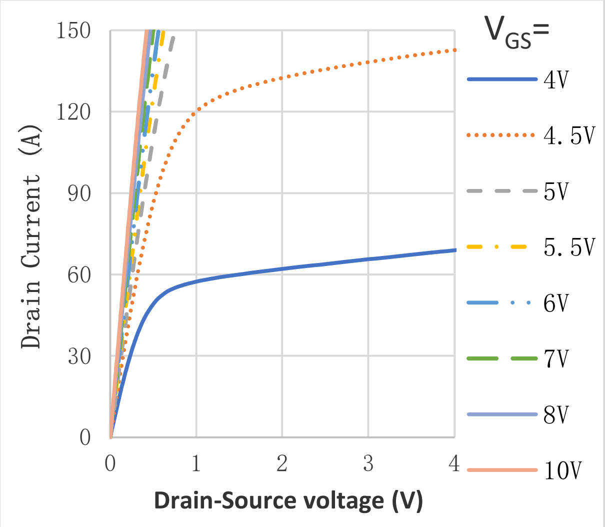
●Fig.1 Gate-source voltage as a function of gate charge; Typical values; T_j=25℃



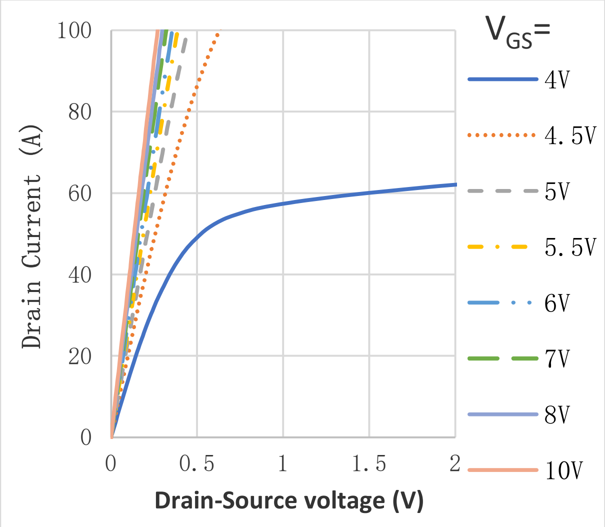
●Fig.2 Input, output and reverse transfer capacitances as a function of drain-source voltage; Typical values; T_j=25℃



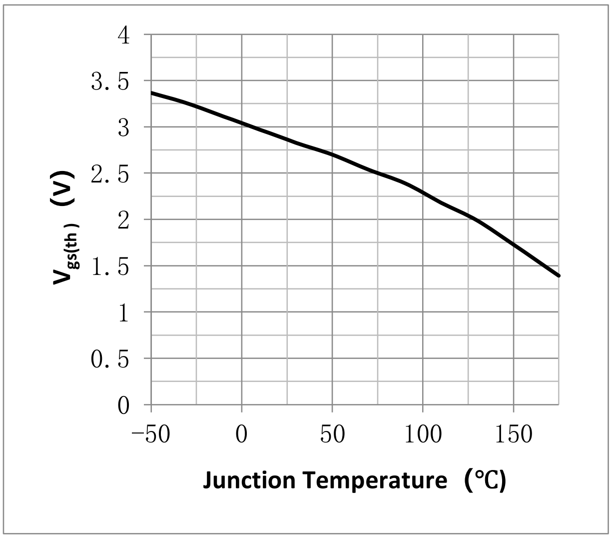
●Fig.3 Output characteristics: drain current as a function of drain-source voltage; Typical values; T_j=25℃



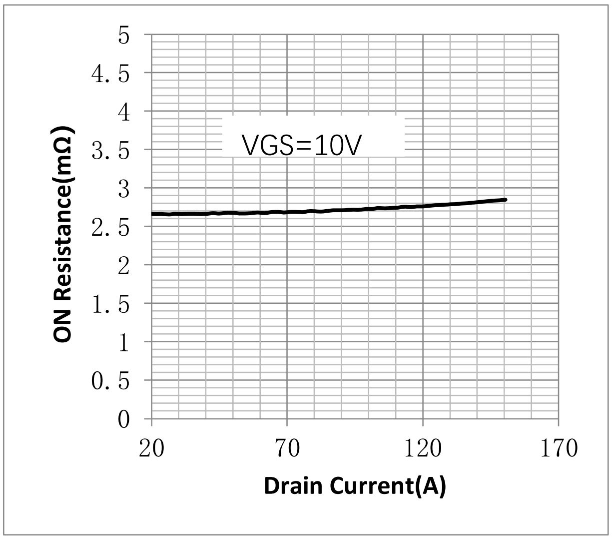
●Fig.4 Output characteristics: drain current as a function of drain-source voltage; Typical values: Expanded curve; T_j=25℃



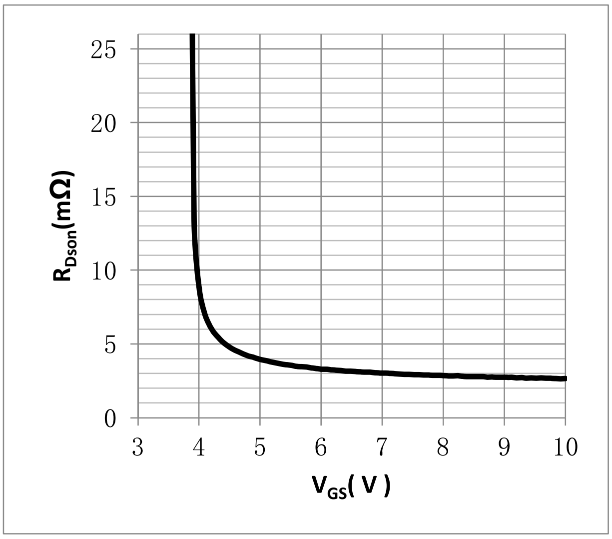
●Fig.5 Gate-source threshold voltage as a function of junction temperature; Typical values



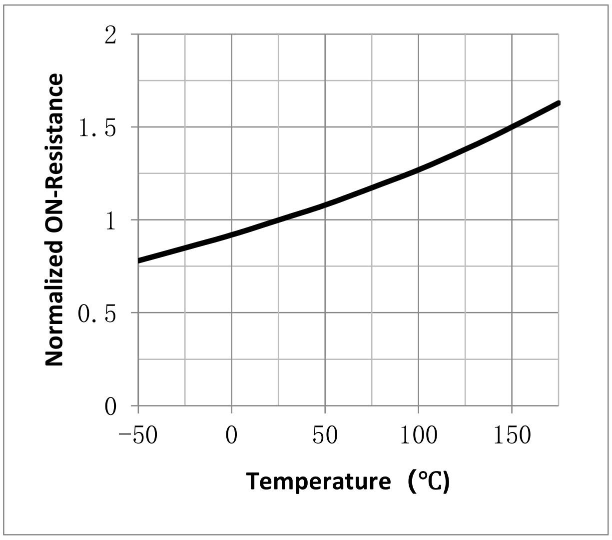
●Fig.6 Drain-source on-state resistance as a function of drain current; Typical values; Tj=25℃



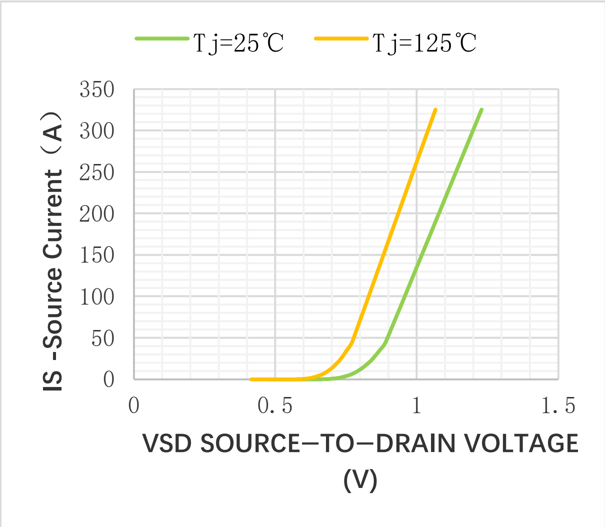
●Fig.7 Drain-source on-state resistance as a function of gate-source voltage; Typical values



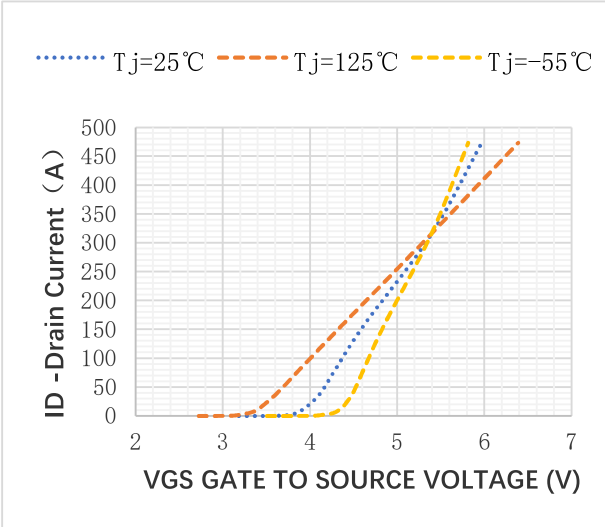
●Fig.8 Normalized drain-source on-state resistance factor as a function of junction temperature; Typical values Normalized On-Resistance=$R_{DSon}/R_{DSon}(25℃)$



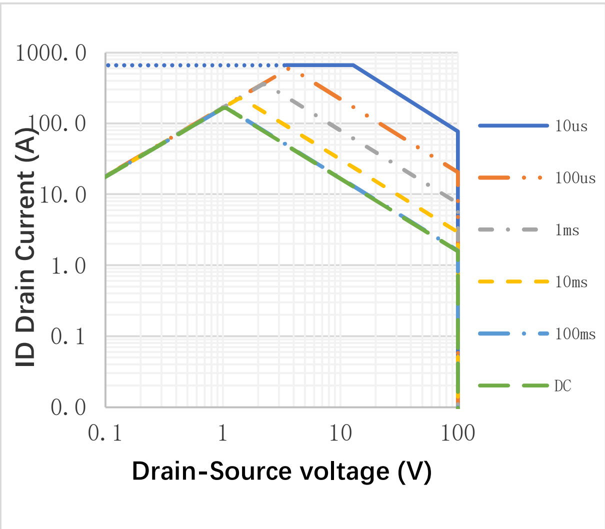
●Figure 9. Source (diode forward) current as a function of source-drain (diode forward) voltage; Typical values



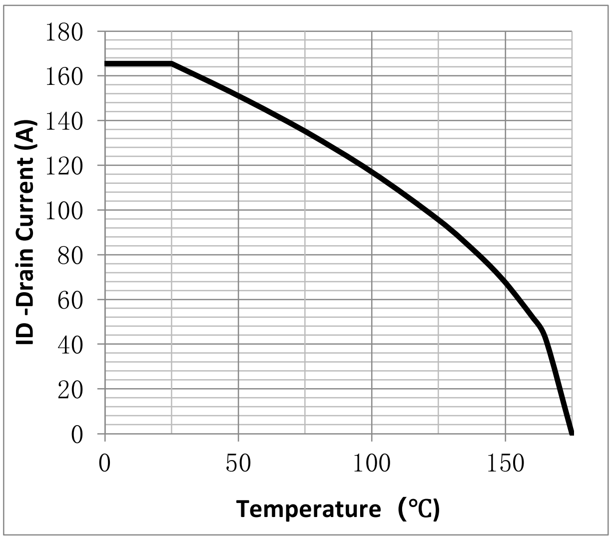
●Figure 10. Transfer characteristics: drain current as a function of gate-source voltage; Typical values



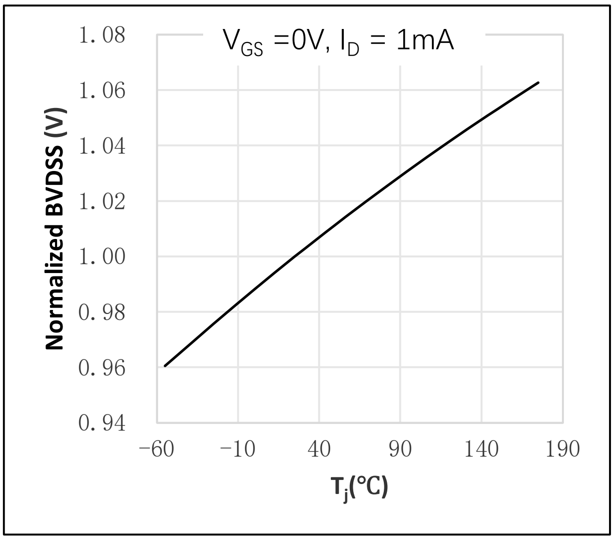
●Fig.11 Safe operating area: continuous and peak drain currents as a function of drain-source voltage; Calculative values



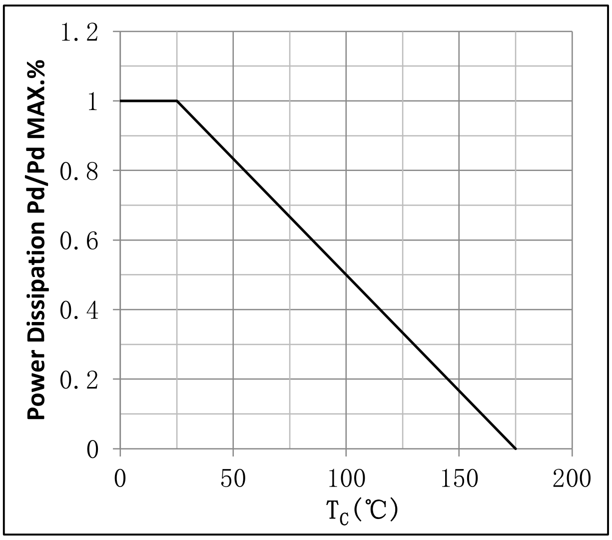
●Fig.12 Continuous drain current as a function of case temperature[3];Calculative values



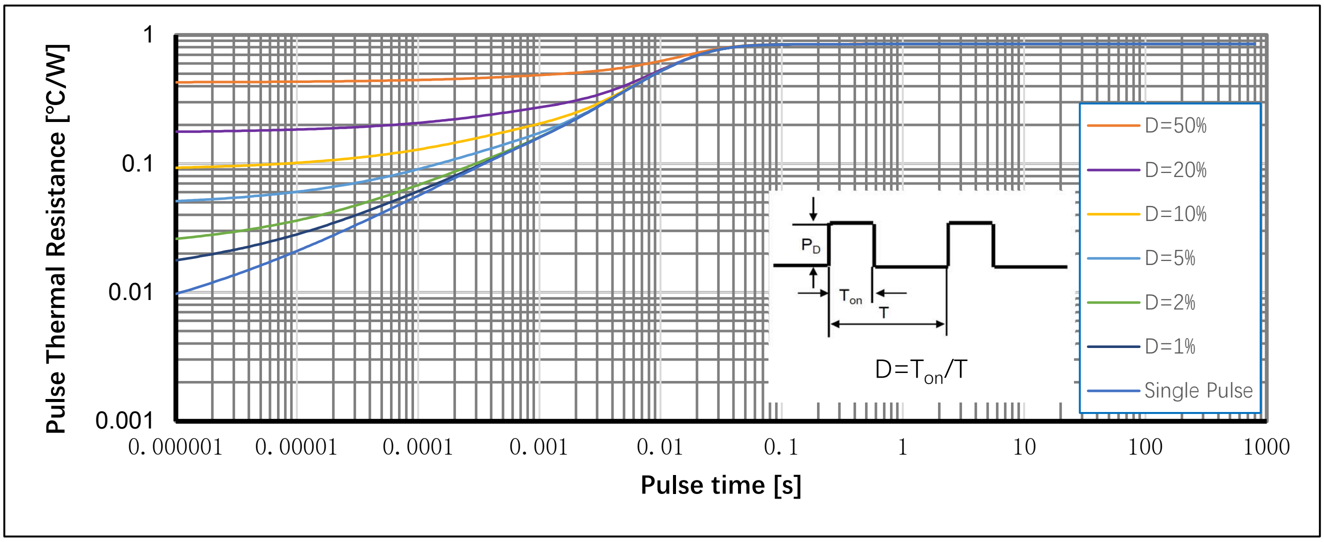
●Fig.13 Drain-source breakdown voltage as a function of junction temperature; Typical values Normalized $BV_{DSS} = BV_{DSS}/BV_{DSS}(25℃)$



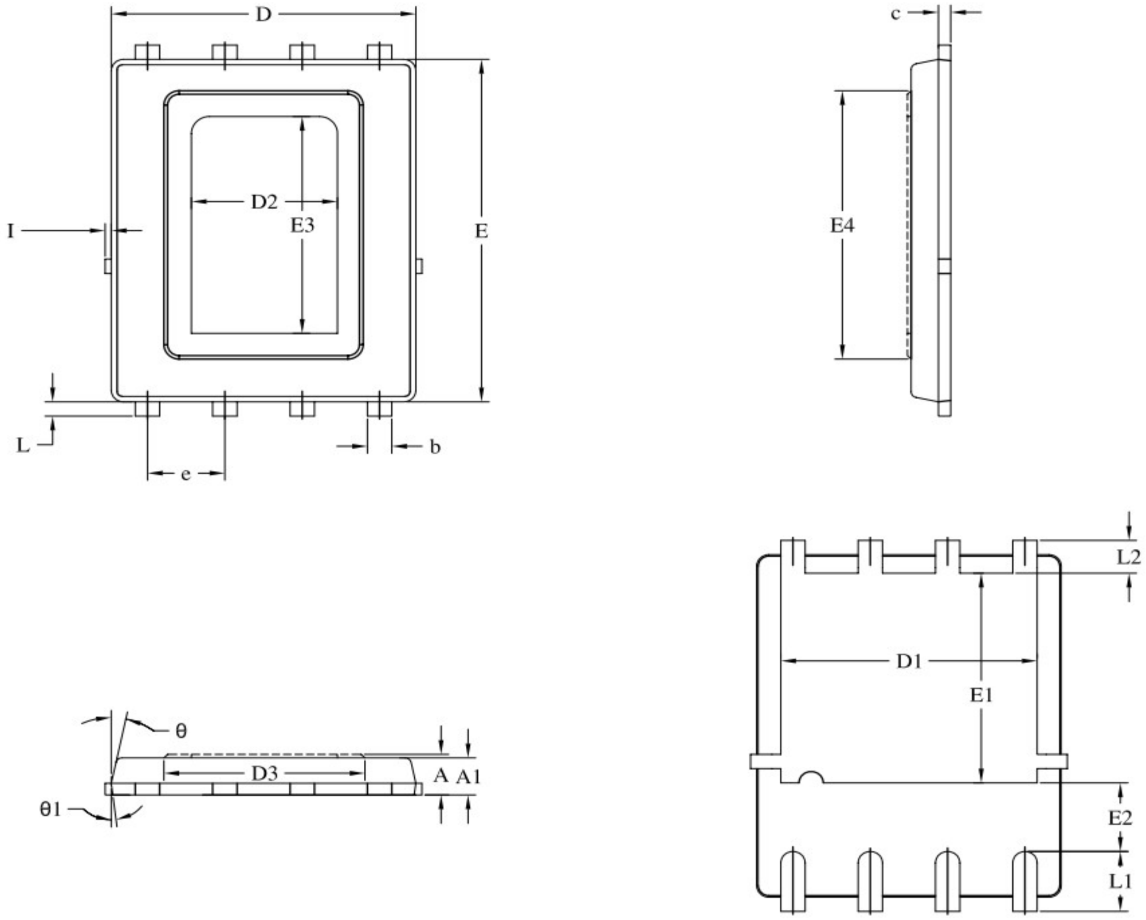
●Fig.14 Normalized total power dissipation as a function of case temperature; Calculative values Normalized Power Dissipation $=P_d/P_d(25℃)$



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



Package Outline



SYMBOL	COMMON		
	MIN.	Nom.	MAX.
A	0.660	0.710	0.760
A1	0.600	-----	0.750
b	0.330	0.430	0.530
c	0.150	0.203	0.300
D	5.00 Bsc.		
D1	4.060	4.210	4.360
D2	2.400 Bsc.		
D3	2.800	3.300	3.800
E	6.00 Bsc.		
E1	3.525	3.675	3.825
E2	1.050	1.200	1.350
E3	3.800 Bsc.		
E4	4.200	4.700	5.200
e	1.270 Bsc.		
I	-----	-----	0.150
L	0.150	0.250	0.350
L1	0.925	1.050	1.175
L2	0.450	0.575	0.700
θ	12° Bsc.		
$\theta 1$	7° Bsc.		

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 1 square inch FR-4 substrate PCB, 1oz copper, minimum footprint, tested in a still air environment with TA=25°C；

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	2024/10/18	New
B	2025/10/15	Apply new datasheet format.