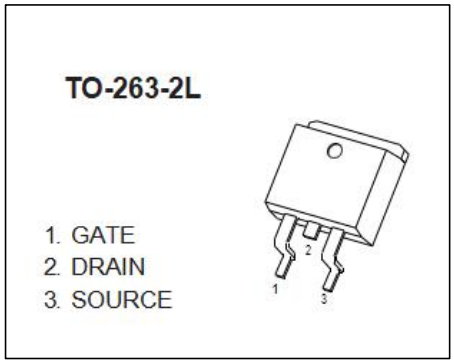
CHONGQING CLOUDCHILD TECHNOLOGY CO., LTD

TO-263-2L Plastic-Encapsulate MOSFETS

CCMA160N04T N-Channel Power MOSFET

V_{DSS}	$R_{DS(ON)}$(Typ.)	I_D
40 V	2.0mΩ@10V 2.3mΩ@4.5V	160A



DESCRIPTION

The CCMA160N04T provides excellent $R_{DS(ON)}$ with low gate charge.

It can be used in a wide variety of applications.

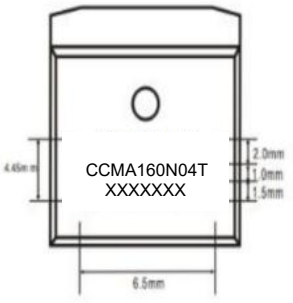
FEATURES

- Power MOSFET for automotive applications
- 100% Avalanche tested
- 175°C operating temperature
- Green Product (RoHS compliant)
- AEC Q101 Qualified

APPLICATIONS

- Electronic water pump
- Electric steering
- ESC

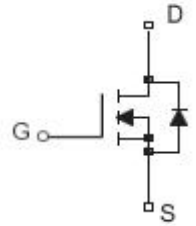
MARKING



CCMA160N04T =Part No.

XXXXXXX = Code

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS(T_c=25℃ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current	I_D	160	A
Pulsed Drain Current[1]	I_{DM}	640	A
Single Pulse Avalanche Energy[2]	E_{AS}	676	mJ
Total Power Dissipation	P_D	100	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	1.5	℃/W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~ +175	℃
Soldering Temperature , for 10S(1.6mm from case)	-	260	℃

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Limited by T_{Jmax}, starting T_J = 25°C, L = 0.5mH， R_G = 25Ω, I_{AS} = 52A, V_{GS} =10V.

MOSFET ELECTRICAL CHARACTERISTICS

TC=25℃ unless otherwise specified

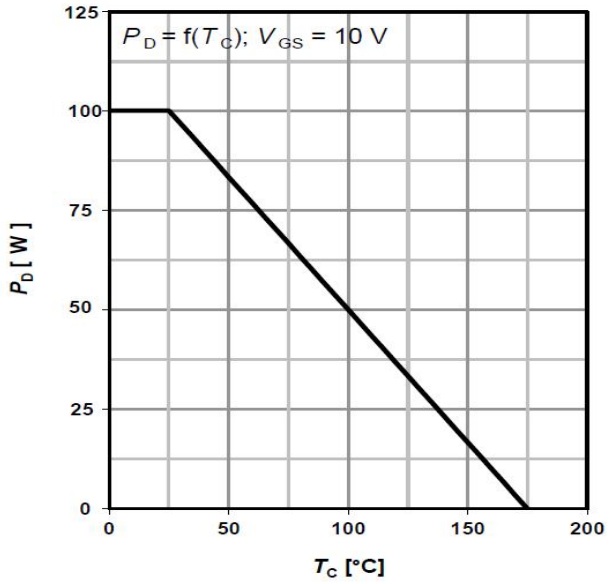
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	40			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =32V,V_{GS} = 0V			1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V			±100	nA
On characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.1	1.5	2.4	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =10A		2.0	2.2	mΩ
		V_{GS} =4.5V, I_D =10A		2.3	2.5	mΩ
Transconductance	gfs	V_{DS} =10V, I_D =10A		72		S
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =25V,V_{GS} =0V,f =1MHz		13450		pF
Output Capacitance	C_{oss}			797		
Reverse Transfer Capacitance	C_{rss}			754		
Gate resistance	R_g	V_{GS} = 0V,V_{DS}=0V,f=1MHz		0.8		Ω
Switching characteristics[1]						
Total Gate Charge	Q_g	V_{DD}=32V , V_{GS}=10V , I_D=160A		62	82	nC
Gate-Source Charge	Q_{gs}			16	21	
Gate-Drain Charge	Q_{gd}			13	20	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V , V_{GS}=10V , I_D=160A， R_G=3.5Ω		7		ns
Turn-on rise time	t_r			4		
Turn-off delay time	$t_{d(off)}$			14		
Turn-off fall time	t_f			7		
Drain-source Diode characteristics						
Diode Forward Voltage[1]	V_{SD}	V_{GS}=0V , I_S=60A , T_J=25℃		0.8	1.2	V
Continuous Source Current[2]	I_S	Tc = 25 °C			160	A
Pulsed drain-source diode forward current	I_{SM}	—			640	A
Reverse recovery time	trr	V_R=20V,I_F=50A di/dt=100A/us		45		ns
Reverse recovery charge	Qrr			41		nC

Note :

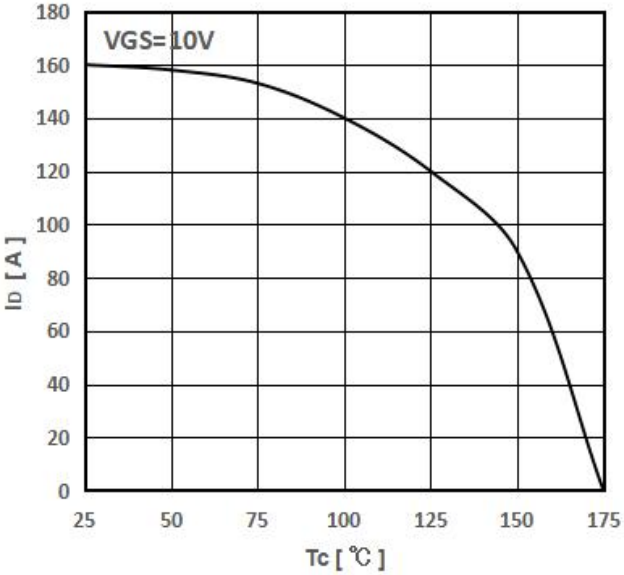
1. Pulse Test: Pulse Width ≤ 400μs, Duty Cycle ≤ 2%.
2. The parameter is not subject to production test-verified by design/characterization.

Typical Characteristics

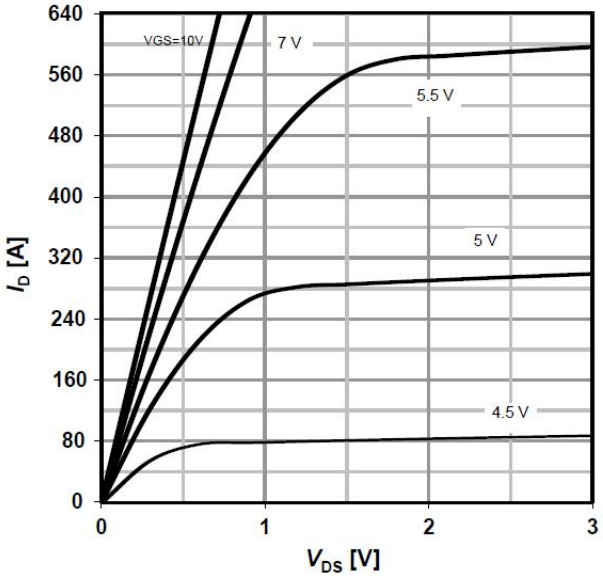
PD -- Tc



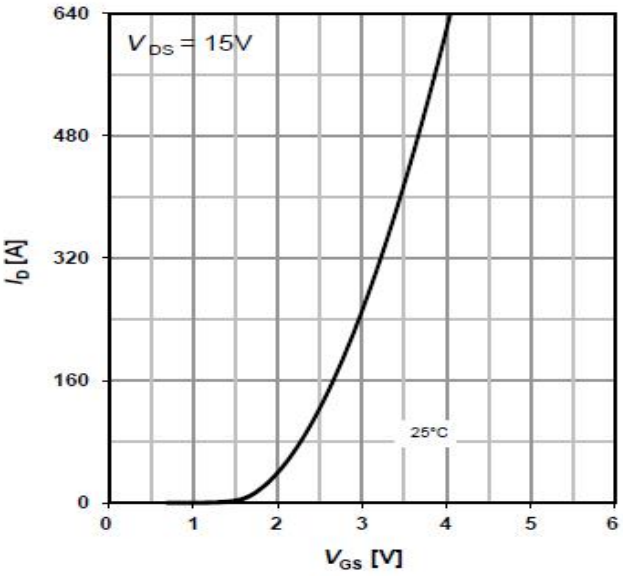
ID -- Tc



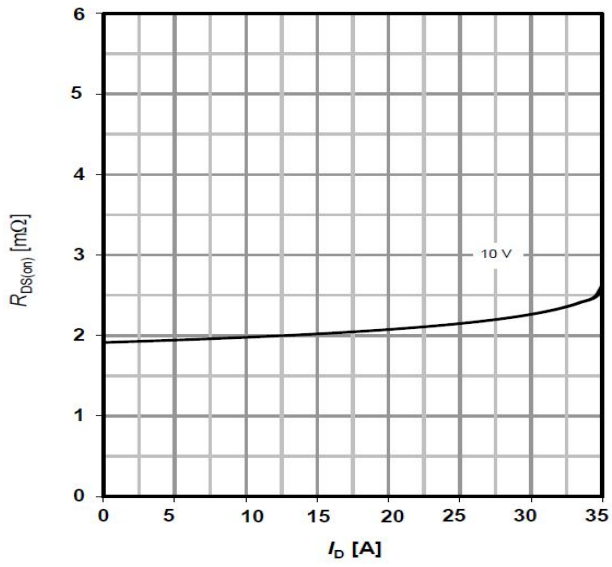
ID -- VDS



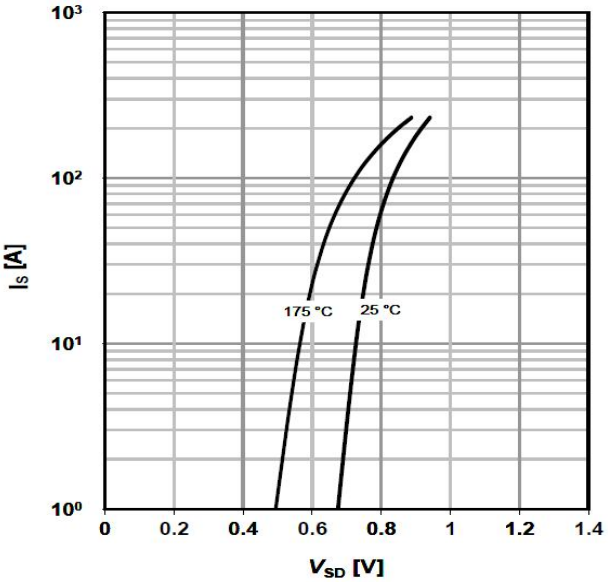
ID -- VGS



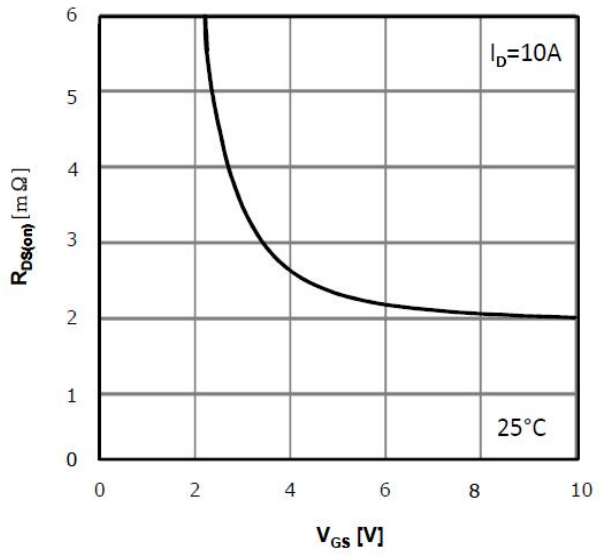
RDS(on) -- ID



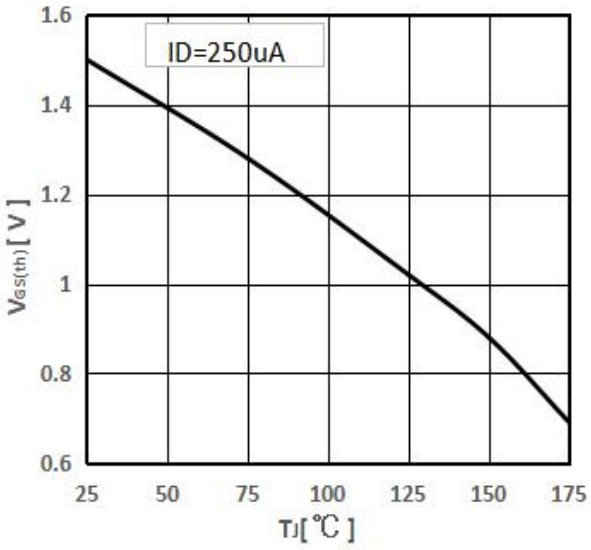
Is -- VSD



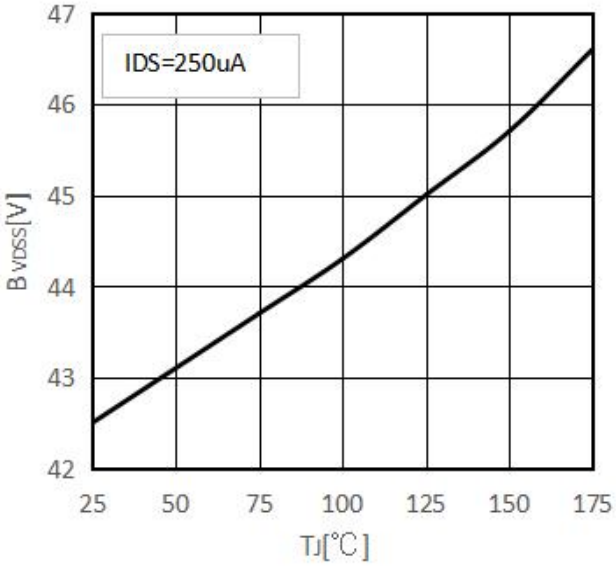
RDS(on) -- VGS



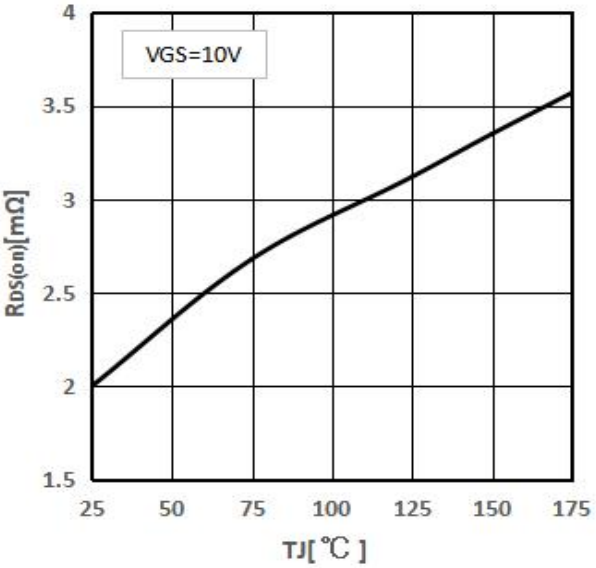
Threshold Voltage



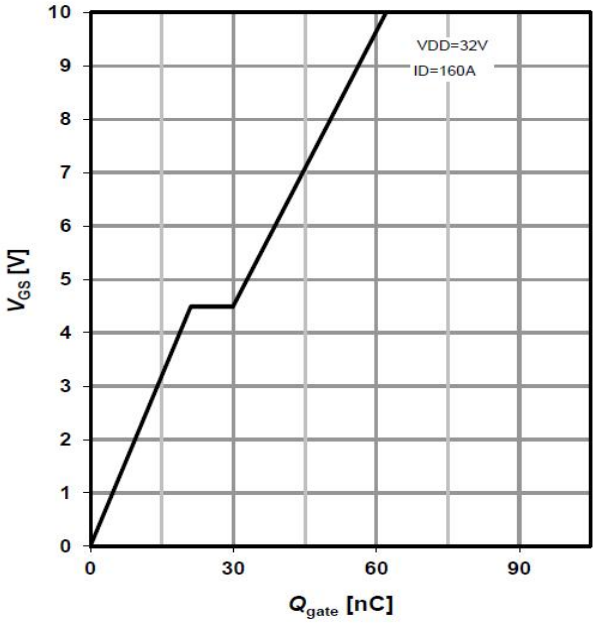
Drain-source breakdown voltage



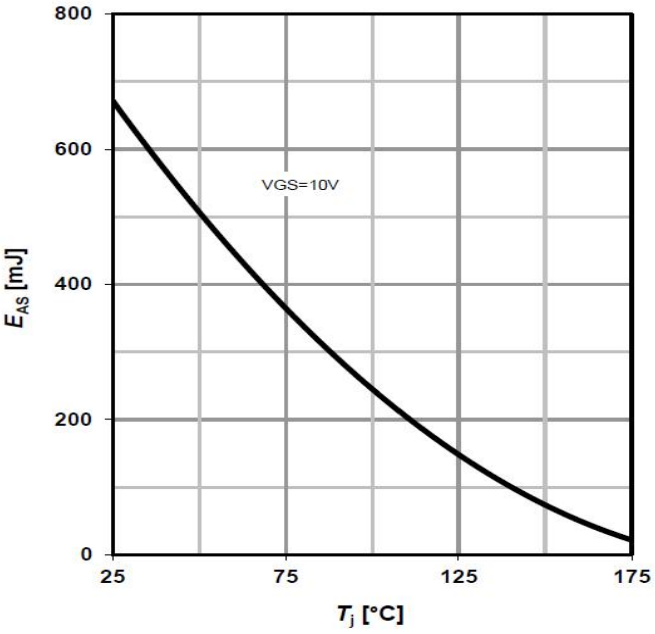
RDS（on） -- Tj



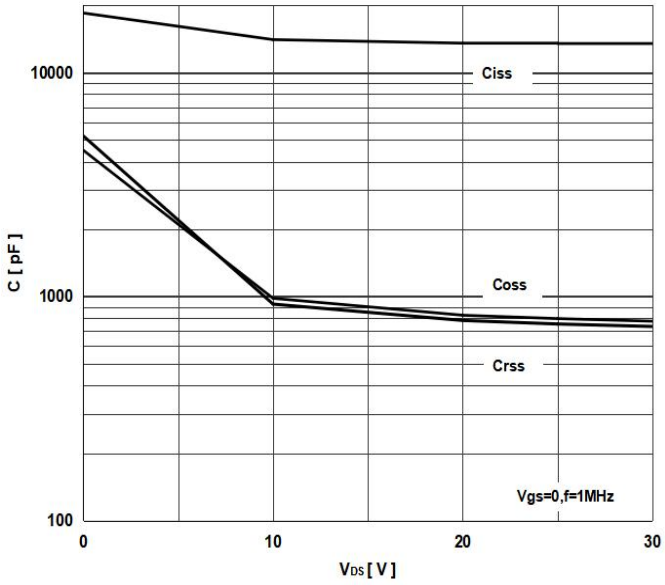
Typ.gate charge



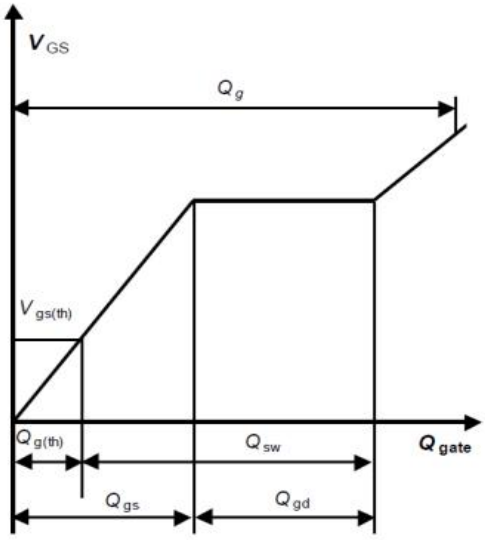
Avalanche energy



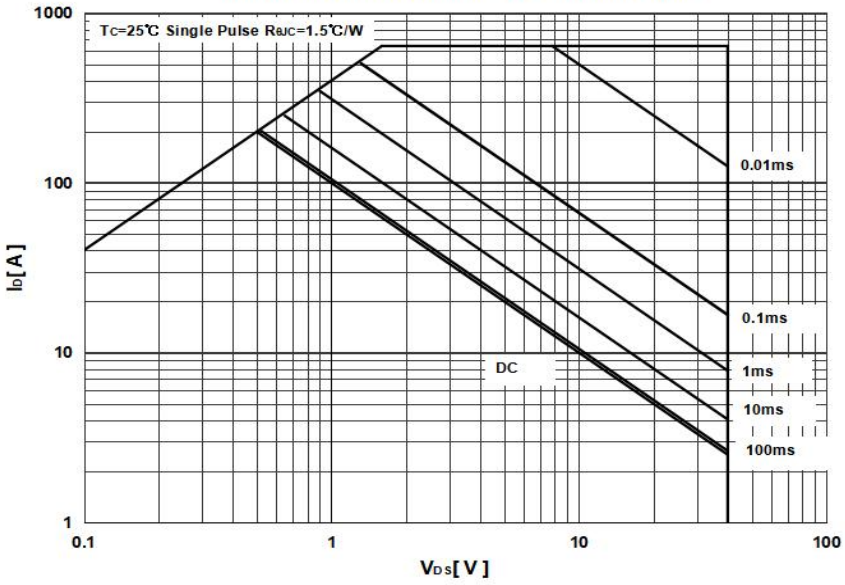
Typ.capacitance



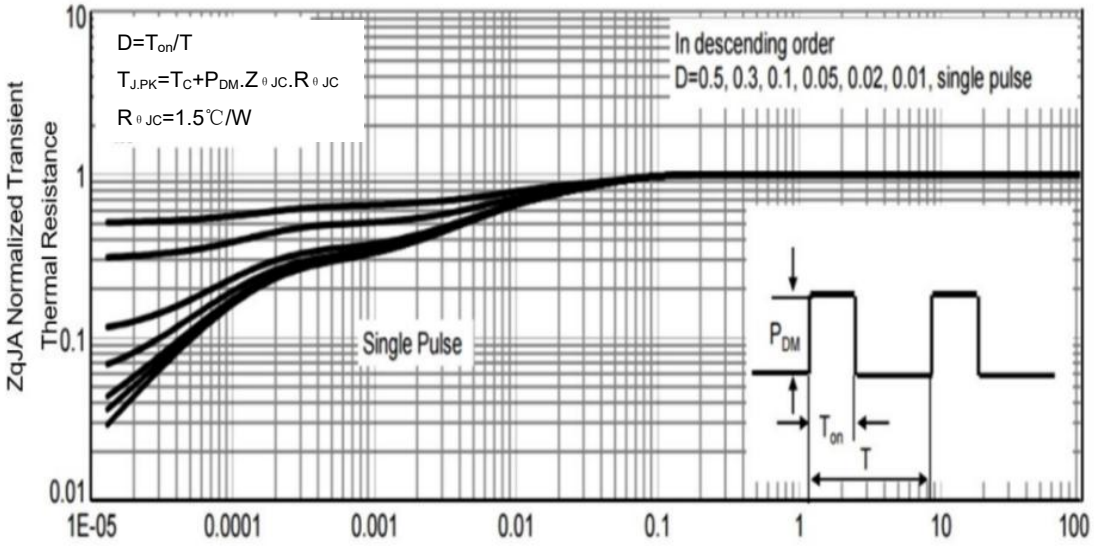
Gate charge waveforms



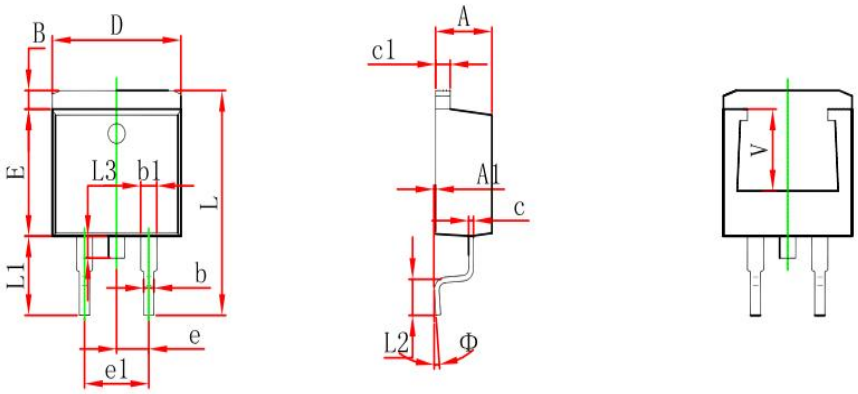
Maximum Forward Biased Safe Operating Area



Normalized Thermal Transient Impedance

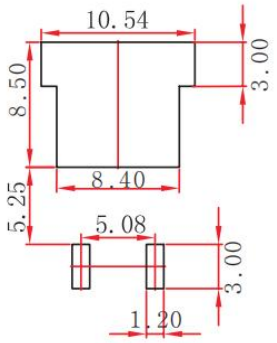


TO-263-2L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
L	14.940	15.500	0.588	0.610
L1	4.950	5.450	0.195	0.215
L2	2.340	2.740	0.092	0.108
L3	1.300	1.700	0.051	0.067
Φ	0°	8°	0°	8°
V	5.600 REF.		0.220REF.	

TO-263-2L Suggested Pad Layout



Note:
1. Controlling dimension：in millimeters.
2. General tolerance:0.5mm.
3. The pad layout is for reference purposes only.

NOTICE

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Date of change	Rev #	revise content
2022/12/20	A/0	/