CHONGQING CLOUDCHILD TECHNOLOGY CO.,LTD

TO-263-2L Plastic-Encapsulate MOSFETS

CCMA160N10S   N-Channel Power MOSFET

V_{DSS}	$R_{DS(ON)}$(Typ.)	I_D
100 V	3.5mΩ@10V	160A

TO-263-2L

1. GATE
2. DRAIN
3. SOURCE

DESCRIPTION

The CCMA160N10S provides excellent $R_{DS(ON)}$ with low gate charge.

It can be used in a wide variety of applications.
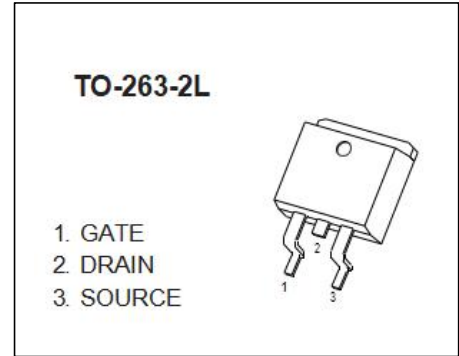
FEATURES

- Improved Gate, Avalanche and Dynamic dv/dt Ruggedness
- Fully Characterized Capacitance and Avalanche SOA
- Enhanced body diode dV/dt and dI/dt Capability
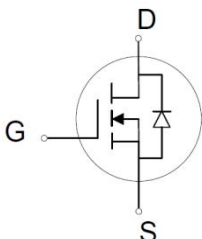- AEC Q101 Qualified

APPLICATIONS

- High Efficiency Synchronous Rectification in SMPS
- Uninterruptible Power Supply
- High Speed Power Switching
- Hard Switched and High Frequency Circuits

MARKING

CCMA160N10S
XXXXXXX

4.45m m
2.0mm
1.0mm
1.5mm
6.5mm
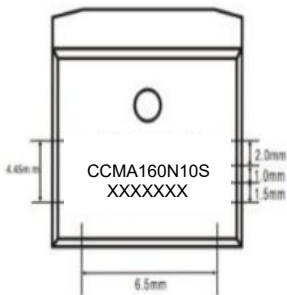
CCMA160N10S =Part No.

XXXXXXX = Code

EQUIVALENT CIRCUIT

D

G

S

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±25	V
Continuous Drain Current	I_D	160	A
Pulsed Drain Current[1]	I_{DM}	640	A
Single Pulse Avalanche Energy[2]	E_{AS}	300	mJ
Total Power Dissipation	P_D	250	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.6	℃/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 = 0.033mH ，R_G = 25Ω, I_{AS} = 135A, V_{GS} =10V. Part not recommended for use above 135A，although measured, the limit value of I_{AS} is 195A.

MOSFET ELECTRICAL CHARACTERISTICS

TC=25℃ unless otherwise specified

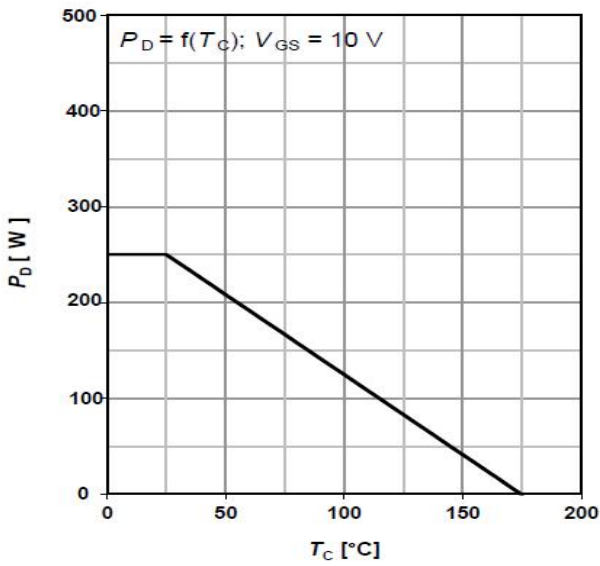| Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	100			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =100V, V_{GS} = 0V			1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V, V_{DS} = 0V			±100	nA
On characteristics						
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2.0	3.0	4.0	V
Drain-source on-resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =1A		3.5	4.0	mΩ
Transconductance	gfs	V_{DS} =10V, I_D =10A		46		S
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =50V, V_{GS} =0V, f =1MHz		5650		pF
Output Capacitance	C_{oss}			1200		
Reverse Transfer Capacitance	C_{rss}			43		
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}=50V, V_{GS}=10V, I_D=75A		105		nC
Gate-Source Charge	Q_{gs}			20		
Gate-Drain Charge	Q_{gd}			28		
Turn-on delay time	$t_{d(on)}$	V_{DD}=50V, V_{GS}=10V, I_D=75A, R_G=2.5Ω		28		ns
Turn-on rise time	t_r			32		
Turn-off delay time	$t_{d(off)}$			80		
Turn-off fall time	t_f			61		
Drain-source Diode characteristics						
Diode Forward Voltage[1]	V_{SD}	V_{GS}=0V, I_S=75A, T_J=25℃			1.3	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_{GS}=0V, I_F=10A, di/dt=100A/us		85		ns
Reverse recovery charge	Qrr			160		nC

Note :

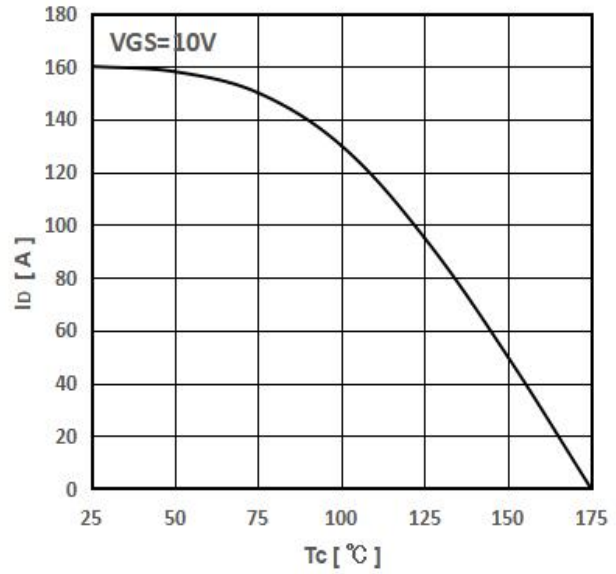1. Pulse Test: Pulse Width ≤ 400μs, Duty Cycle ≤ 2%.

2. Calculated continuous current based on maximum allowable junction temperature. Bond wire current limit is 120A. Note that current limitations arising from heating of the device leads may occur with some lead mounting arrangements.
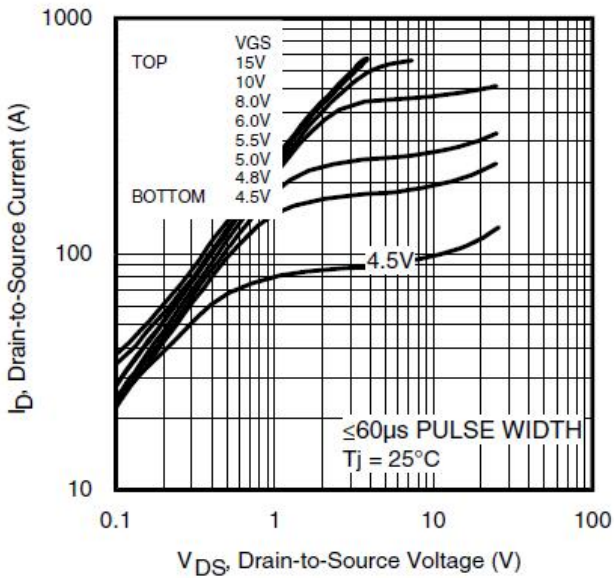
Typical Characteristics

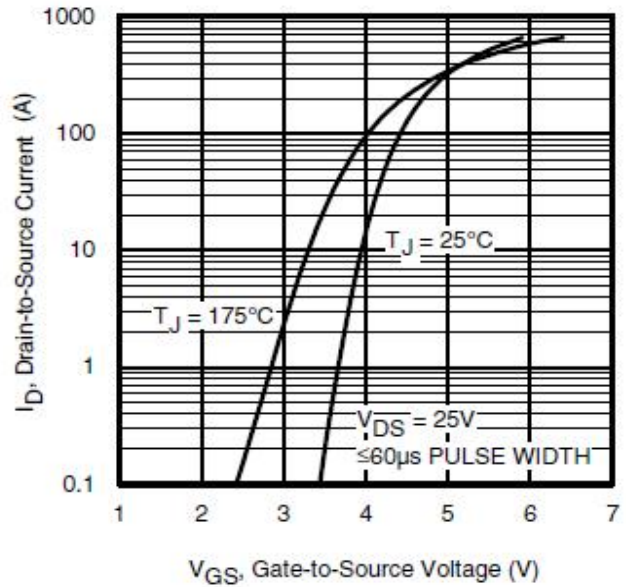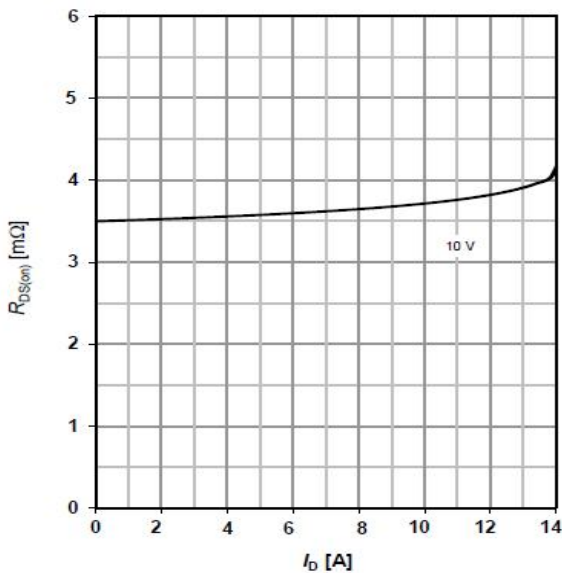### PD -- Tc

$P_D = f(T_C); V_{GS} = 10$ V

ID -- Tc

VGS= 10V

ID -- VDS

VGS
TOP
15V
10V
8.0V
6.0V
5.5V
5.0V
4.8V
BOTTOM
4.5V

4.5V

≤60µs PULSE WIDTH
Tj = 25°C

ID -- VGS

$T_J = 25°C$

$T_J = 175°C$

$V_{DS} = 25$V
≤60µs PULSE WIDTH

RDS(on) -- ID

10 V
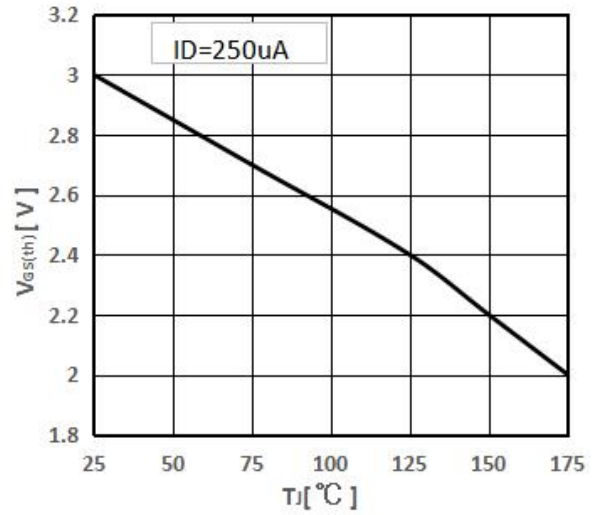
Is -- VSD
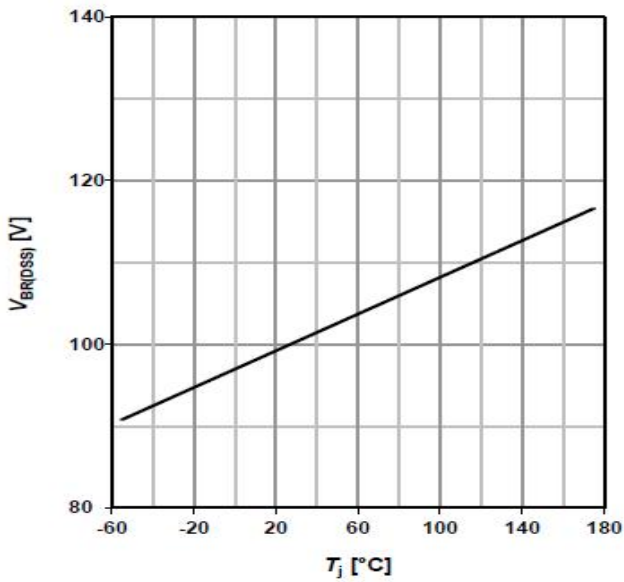

$T_J = 175°C$

$T_J = 25°C$

$V_{GS} = 0$V
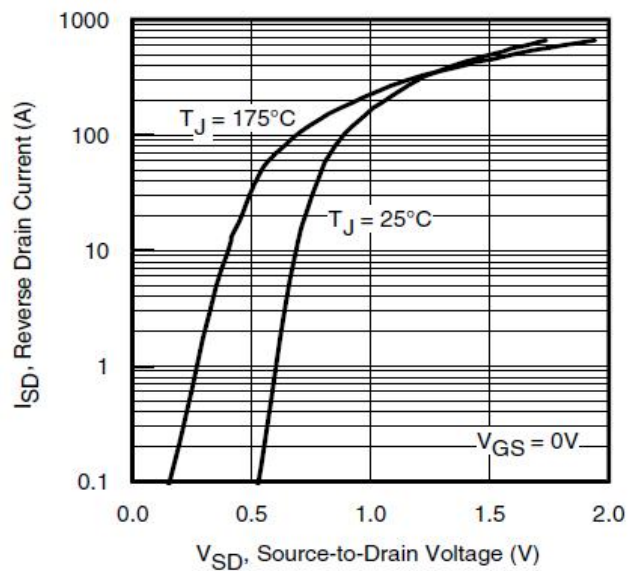
RDS(on) -- VGS
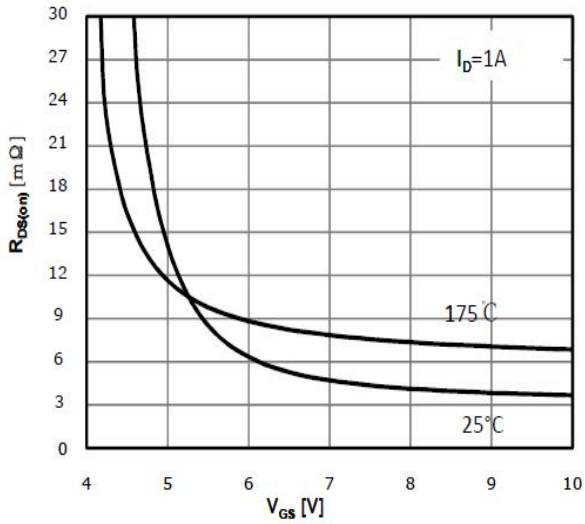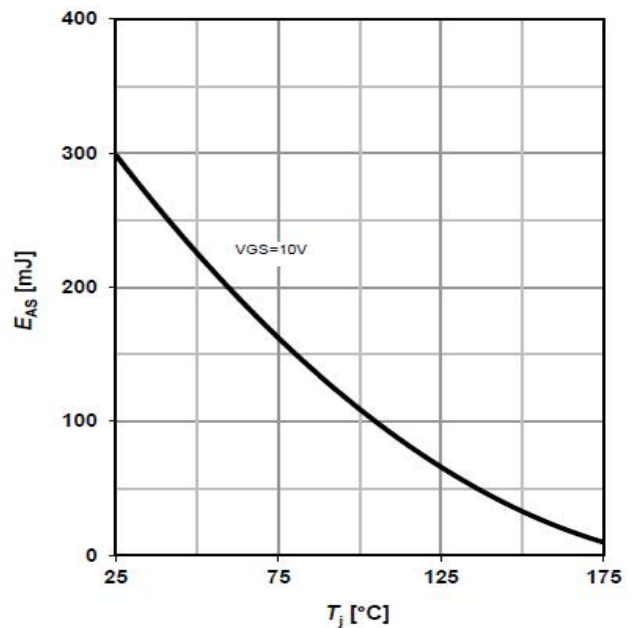
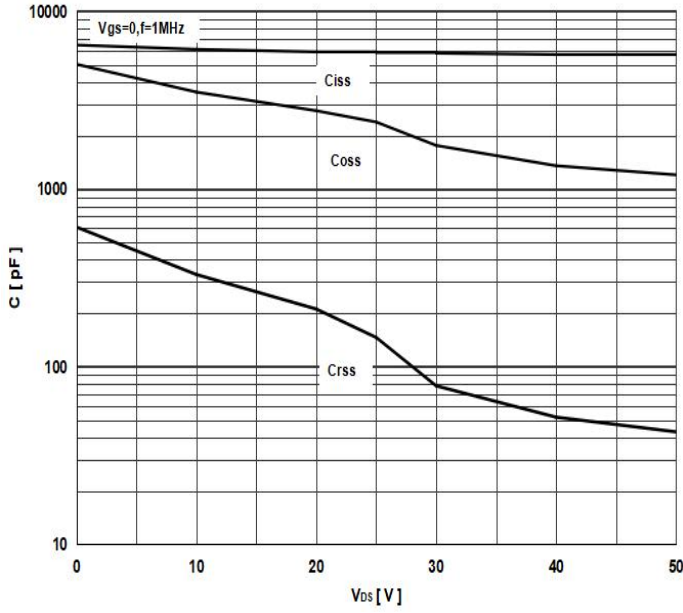## Threshold Voltage

Drain-source breakdown voltage

RDS（on） -- Tj
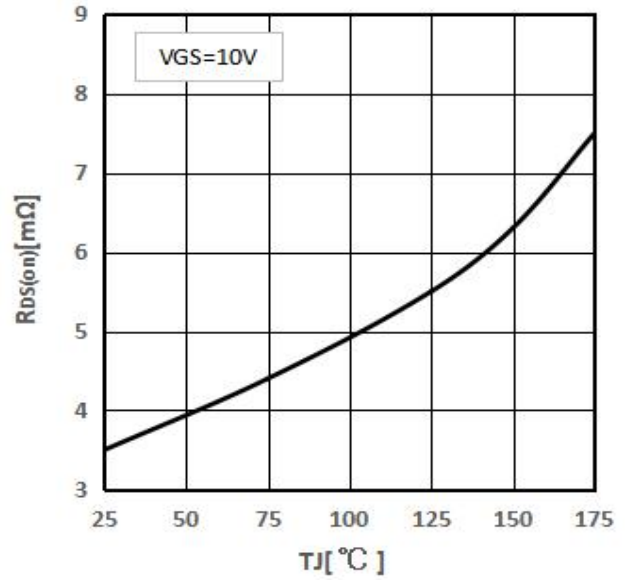
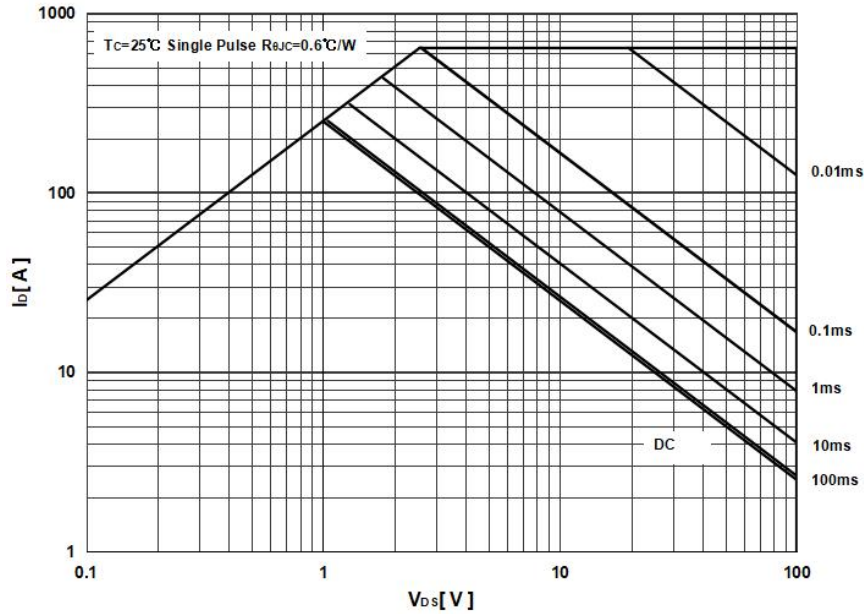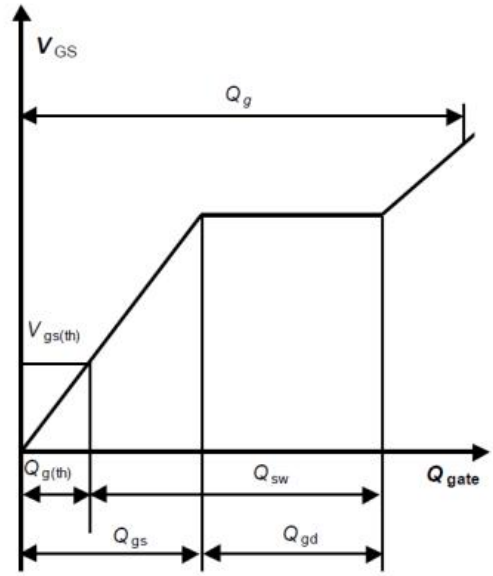## Typ.gate charge
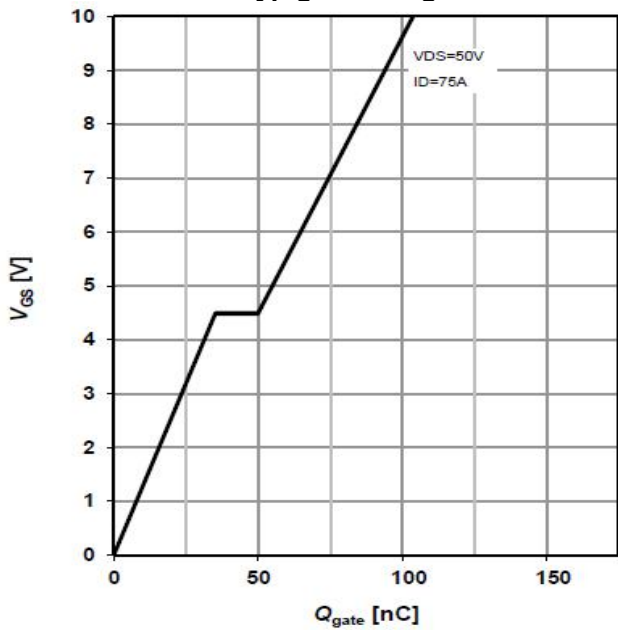
Avalanche energy

Typ.capacitance

## Gate charge waveforms

Normalized Thermal Transient Impedance

$D=T_{on}/T$

$T_{J.PK}=T_C+P_{DM}.Z_{\theta JC}.R_{\theta JC}$

$R_{\theta JC}=0.6℃/W$

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

Single Pulse
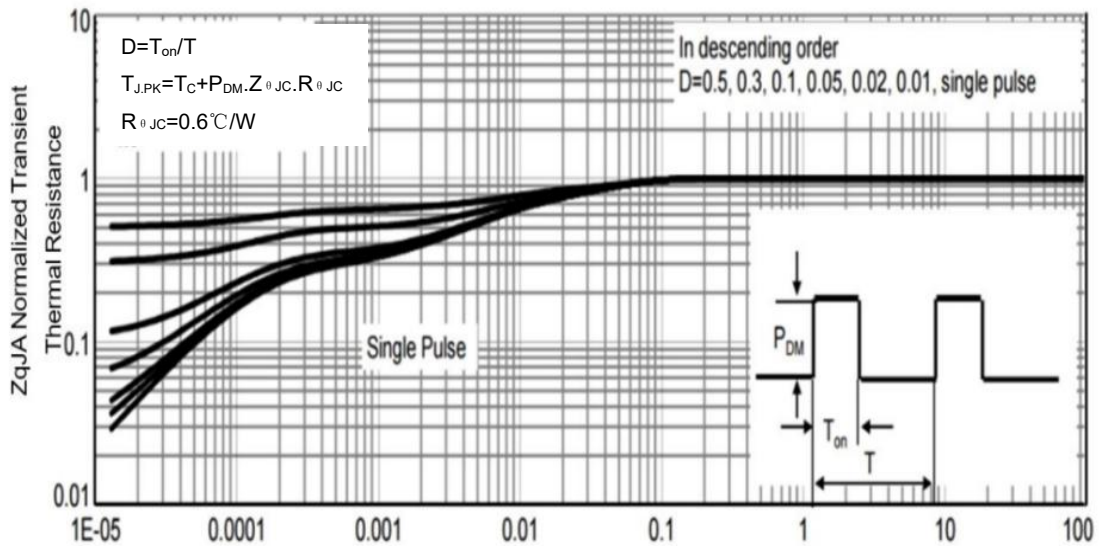
TO-263-2L Package Outline Dimensions
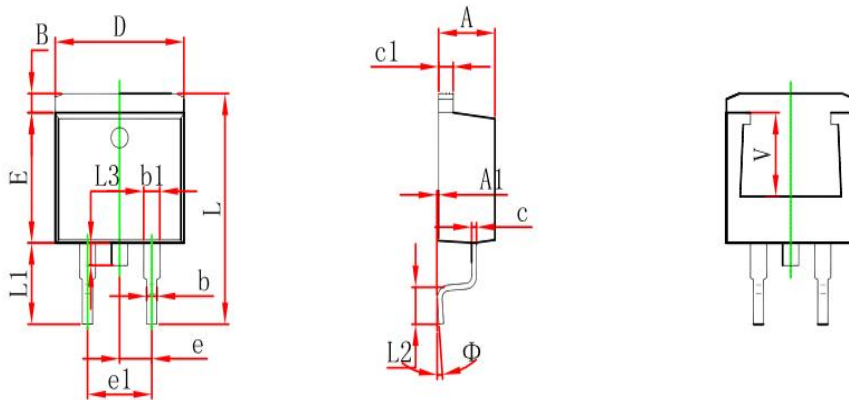
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	0.000	0.150	0.000	0.006
B	1.120	1.420	0.044	0.056
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	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.		0.220 REF.	

TO-263-2L Suggested Pad Layout
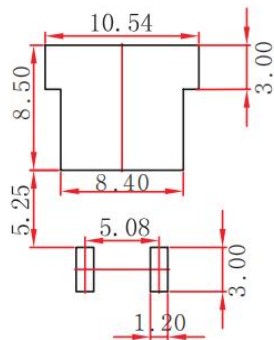
Note:
1. Controlling dimension：in millimeters.
2. General tolerance:0.5mm.
3. The pad layout is for reference purposes only.

Date of change	Rev #	revise content
2022/11/15	A/0	/