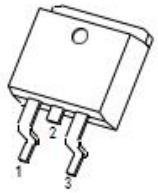
CHONGQING CLOUDCHILD TECHNOLOGY CO., LTD

TO-252-2L Plastic-Encapsulate MOSFETS

CCMC50N06S N-Channel Power MOSFET

V_{DSS}	$R_{DS(ON)}$(Typ.)	I_D
60 V	7.5mΩ@10V 10mΩ@4.5V	50A

TO-252-2



1. GATE
2. DRAIN
3. SOURCE

DESCRIPTION

The CCMC50N06S provides excellent $R_{DS(ON)}$ with low gate charge.

It can be used in a wide variety of applications.

FEATURES

- High density cell design for ultra low $R_{DS(ON)}$
- Repetitive avalanche rated
- AEC Q101 Qualified

APPLICATIONS

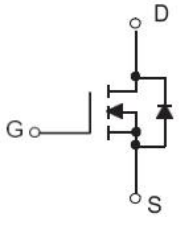
- 12V/24V Automotive systems
- Motors, lamps and solenoid control
- Transmission control
- High-frequency switching and synchronous rectification

MARKING

CCMC50N06S =Part No.

XXXXXXX = Code.

EQUIVALENT CIRCUIT



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

Parameter	Symbol	Value		Unit
Drain-Source Voltage	V_{DSS}	60		V
Gate-Source Voltage	V_{GS}	±20		V
Continuous Drain Current[1]	I_D	50		A
Pulsed Drain Current[2]	I_{DM}	200		A
Single Pulse Avalanche Energy[23]	E_{AS}	110		mJ
Total Power Dissipation	P_D	52		W
Thermal Resistance from Junction to Case[2]	$R_{\theta JC}$	2.9		℃/W
SMD version, device on PCB[4]	$R_{\theta JA}$	minimal footprint	62	℃/W
		6cm^2 cooling area	40	℃/W
Junction Temperature	T_J	175		℃
Storage Temperature	T_{STG}	-55~ +175		℃
Soldering Temperature , for 10S(1.6mm from case)	-	260		℃

Notes:

1. Current is limited by package; with a Rthjc = 2.9 ℃/W the chip is able to carry 67A at 25°C.
2. Specified by design. Not subject to production test.
3. EAS condition: Tj=25℃,VDD=30V,L=0.5mH, RG=25Ω, ID=21A,Starting TJ =25°C.
4. Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm2 (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

MOSFET ELECTRICAL CHARACTERISTICS

TC=25℃ unless otherwise specified

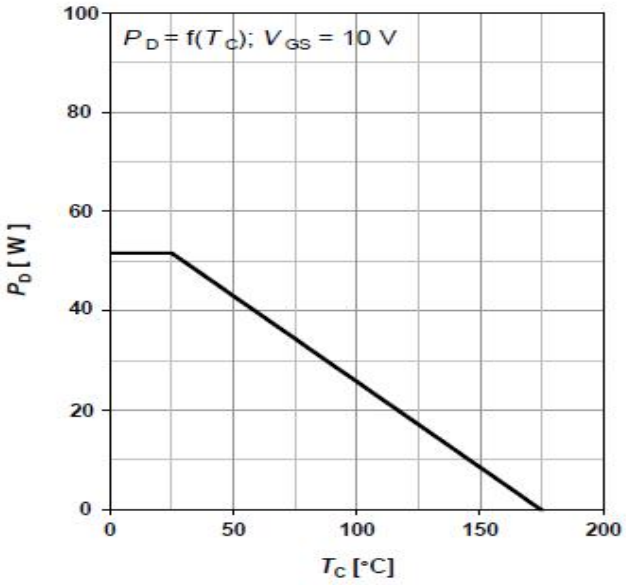
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	$V_{(BR)\ DSS}$	V_{GS} = 0V, I_D =250μA	60			V
Zero gate voltage drain current	I_{DSS}	V_{DS} =60V, V_{GS} =0V			1	μA
Gate-body leakage current	I_{GSS}	V_{DS} =0V, V_{GS} =±20V			±100	nA
On characteristics						
Gate-threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1.5	1.7	2.5	V
Static drain-source on-sate resistance	$R_{DS(on)}$	V_{GS} =10V, I_D =50A		7.5	10	mΩ
		V_{GS} =4.5V, I_D =25A		10	14	mΩ
Forward transconductance	g_{FS}	V_{DS} =10V, I_D =10A		65		S
Dynamic characteristics[1]						
Input capacitance	C_{iss}	V_{DS} =25V,V_{GS} =0V, f =1MHz		1560	2028	pF
Output capacitance	C_{oss}			351	456	
Reverse transfer capacitance	C_{rss}			25	33	
Gate resistance	R_g	f =1MHz		1.7		Ω
Switching characteristics [1]						
Total gate charge	Q_g	V_{GS}=0-10V, V_{DD}=48V, I_D=50A		30	40	nC
Gate-source charge	Q_{gs}			10	12	
Gate-drain charge	Q_{gd}			3	7	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V,I_D=50A , V_{GS}=10V,R_G=3.5Ω		6		ns
Turn-on rise time	t_r			2		
Turn-off delay time	$t_{d(off)}$			26		
Turn-off fall time	t_f			5.5		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage	V_{SD}	V_{GS} =0V, I_S=50A		0.87	1.3	V
Continuous drain-source diode forward Current[12]	Is	-			50	A
Pulsed drain-source diode forward current[1]	I_{SM}	-			200	A
Reverse recovery time[1]	Trr	I_F=50A, dI/dt=100A/us,V_R=30V		22		ns
Reverse recovery charge[1]	Qrr			20		nC

Note :

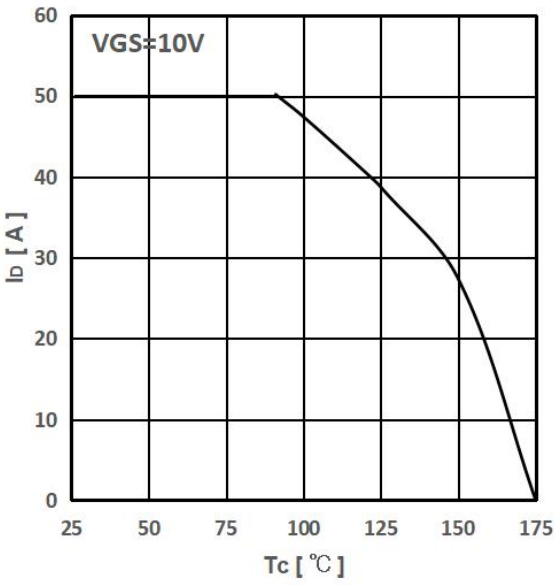
1. Specified by design. Not subject to production test.
2.Current is limited by package; with a Rthjc = 2.9 ℃/W the chip is able to carry 67A at 25°C.

Typical Characteristics

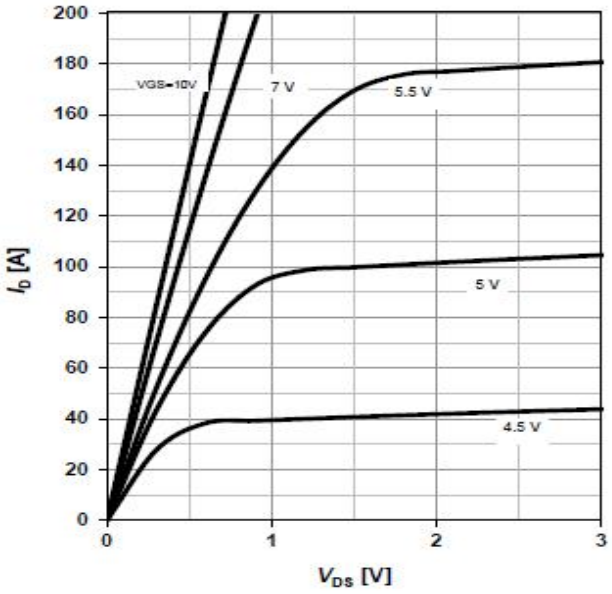
PD -- Tc



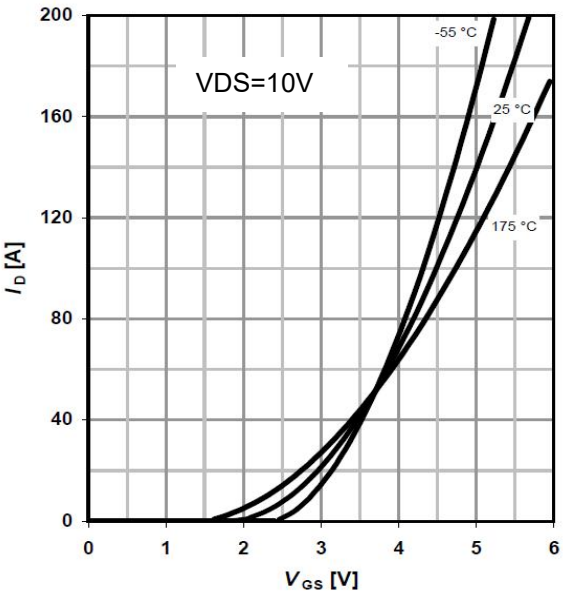
ID -- Tc



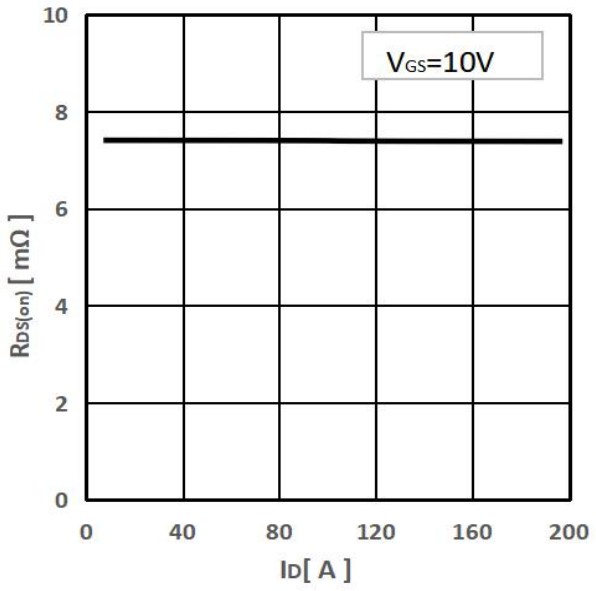
ID -- VDS



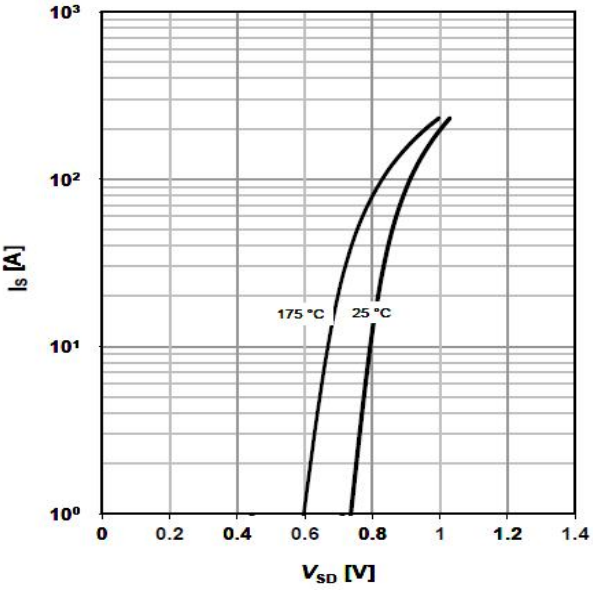
ID -- VGS



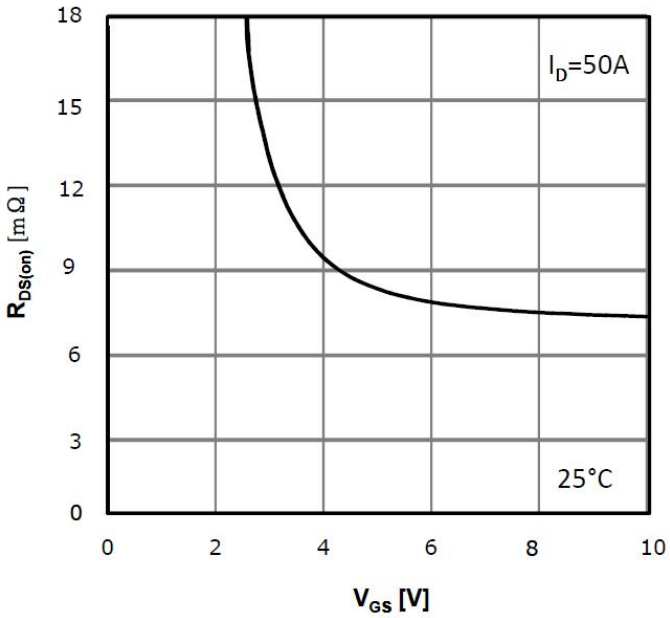
RDS(on) -- ID



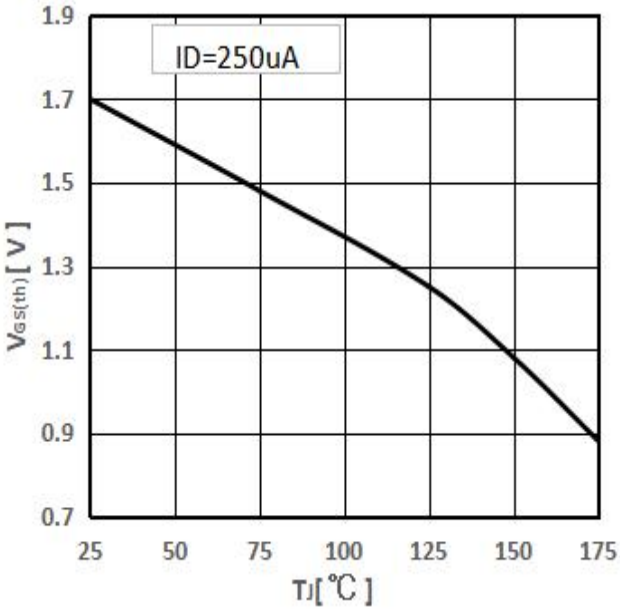
Is -- VSD



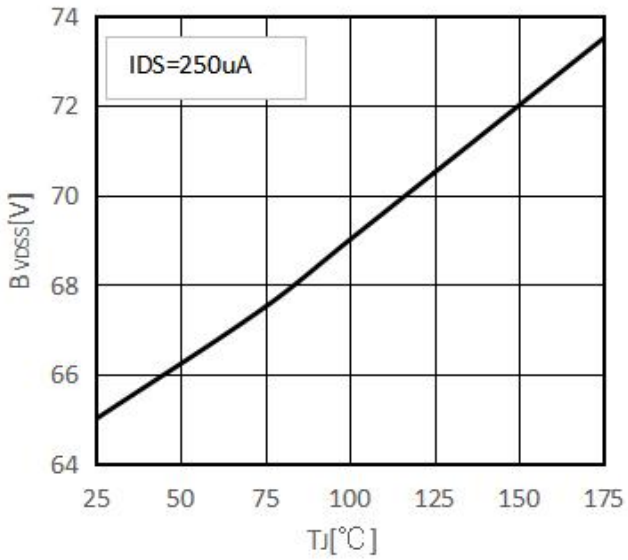
RDS(on) -- VGS



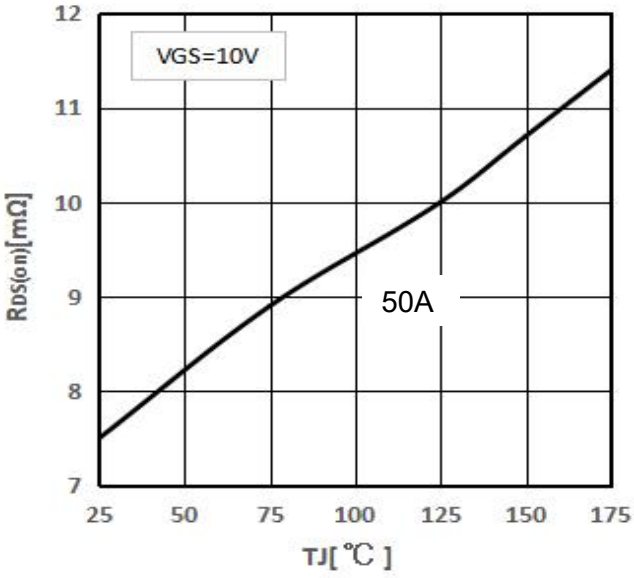
Threshold Voltage



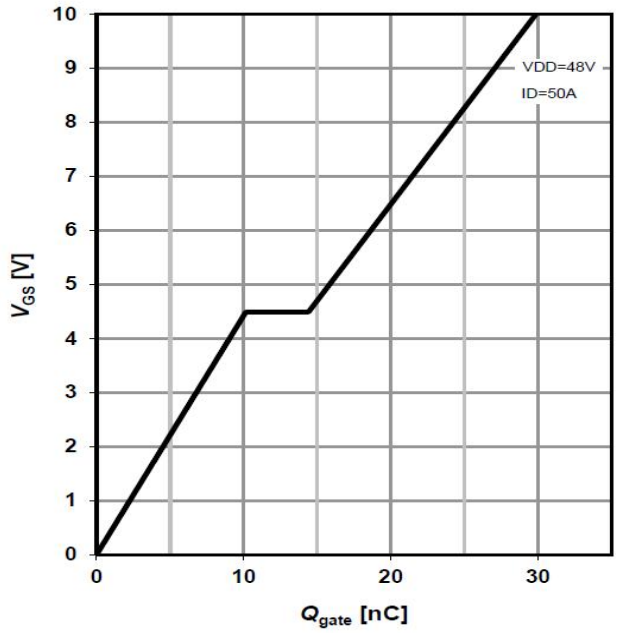
Drain-source breakdown voltage



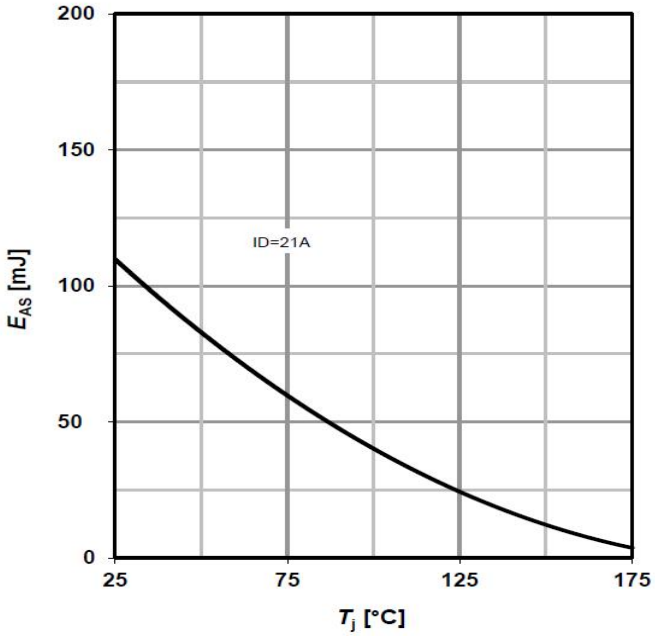
RDS（on） -- Tj



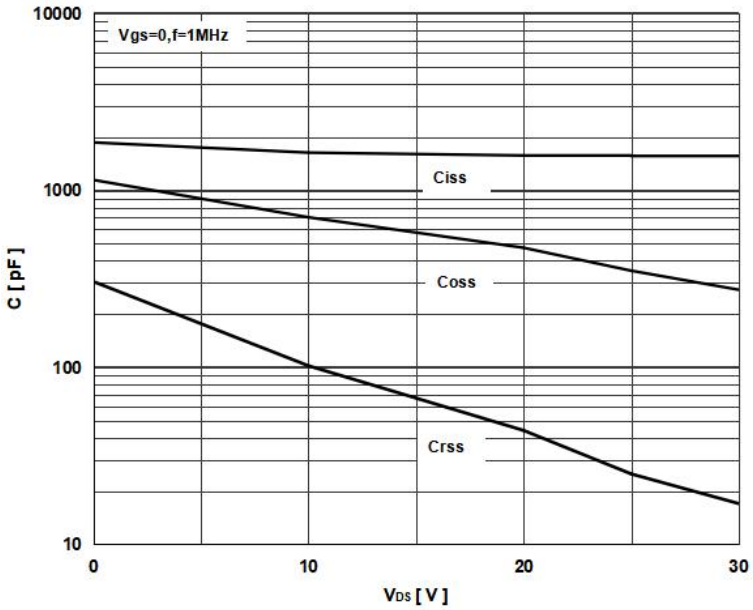
Typ.gate charge



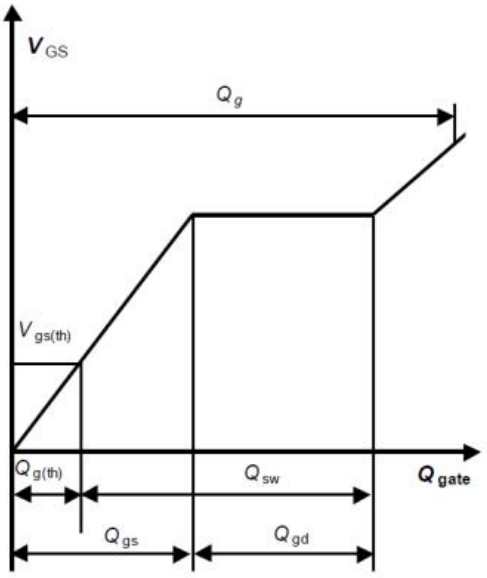
Avalanche energy



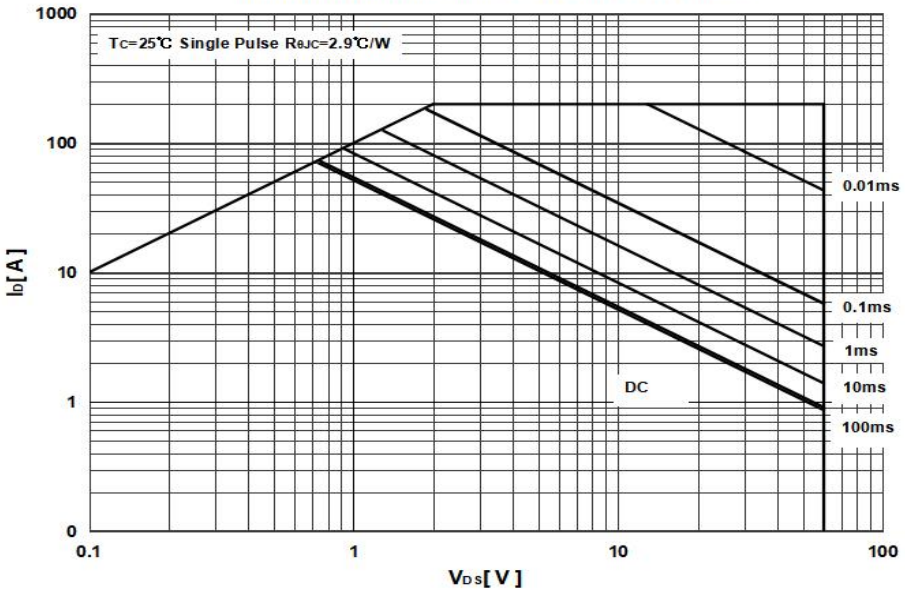
Typ.capacitance



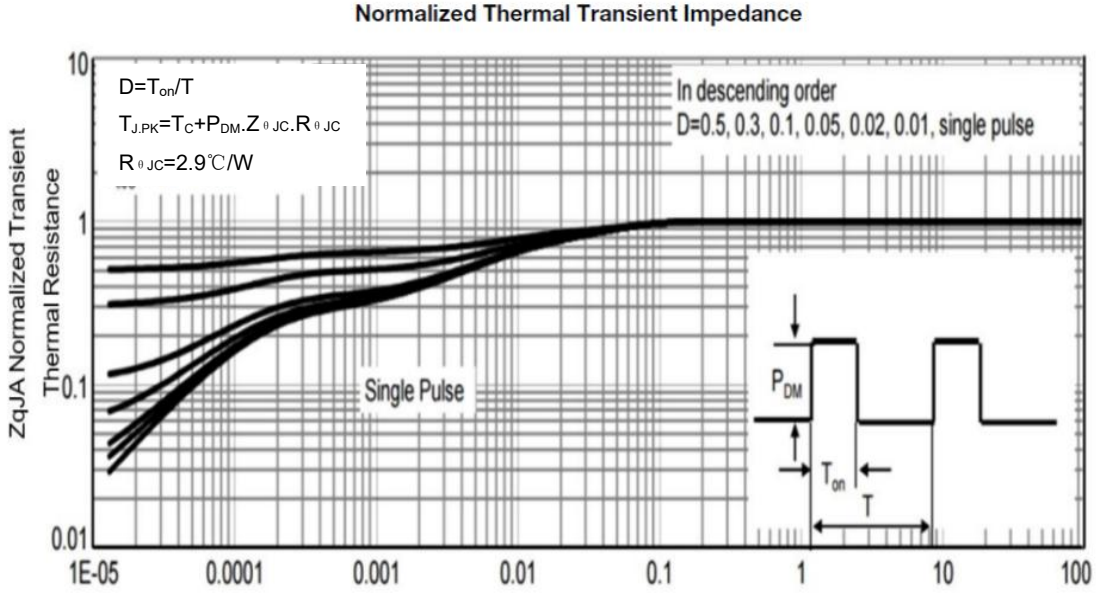
Gate charge waveforms



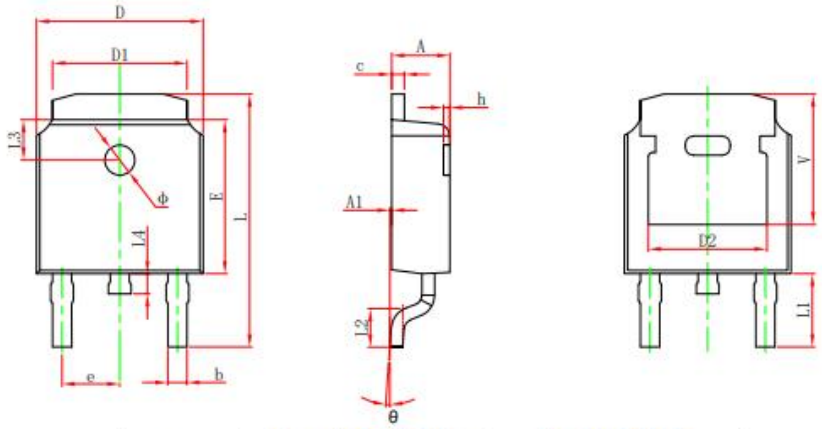
Maximum Forward Biased Safe Operating Area



Normalized Thermal Transient Impedance

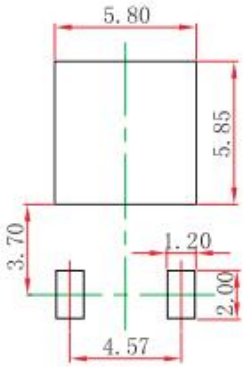


TO-252-2L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

TO-252-2L 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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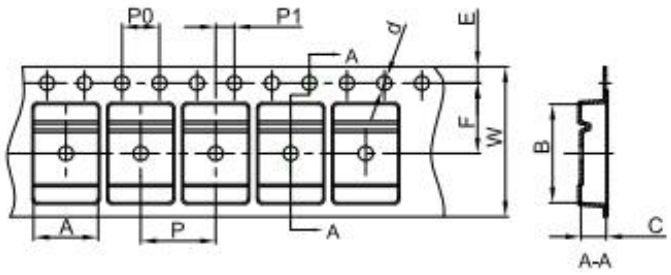
TO-252-2L Tape and Reel

TO-252 Embossed Carrier Tape

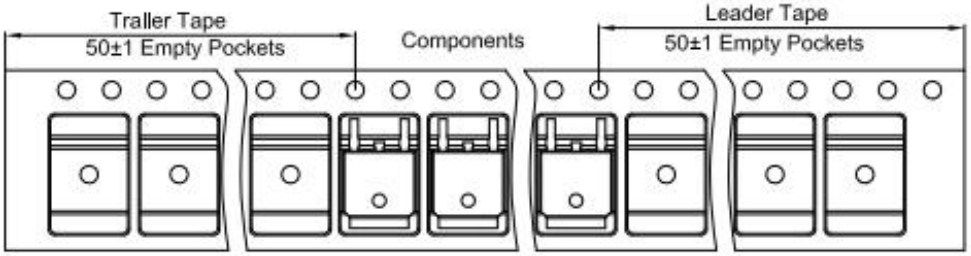


Packaging Description:

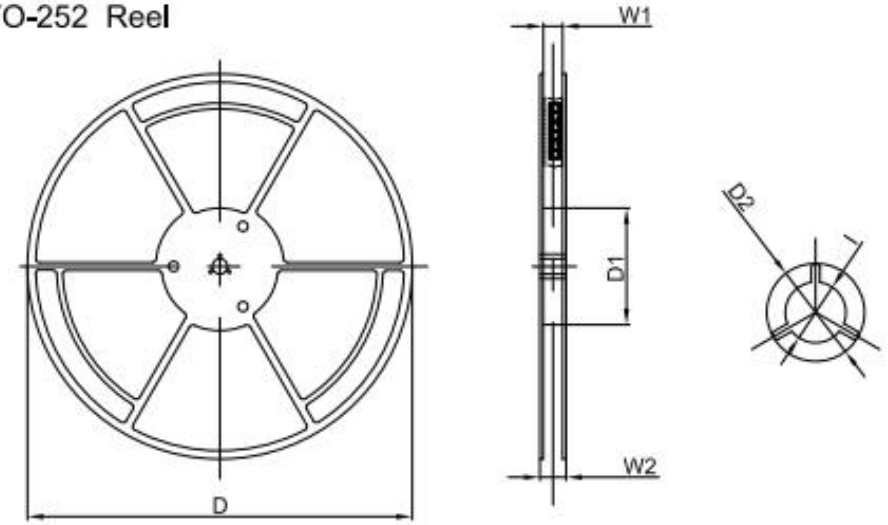
TO-252 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 25,00 units per 13" or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
TO-252	6.90	10.50	2.70	Ø1.55	1.75	7.50	4.00	8.00	2.00	16.00

TO-252 Tape Leader and Trailer



TO-252 Reel



Dimensions are in millimeter						
Reel Option	D	D1	D2	W1	W2	I
13"Dia	330.00	100.00	Ø21.00	16.40	21.00	Ø13.00

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
2,500 pcs	13Inch	2,500 pcs	340×336×29	25,000 pcs	353×346×365	

Date of change	Rev #	revise content
2023/11/16	A/0	/