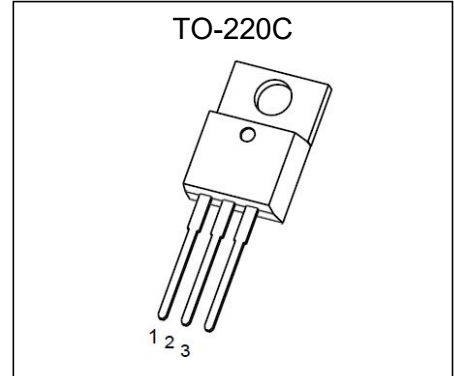




**TO-220-C Plastic-Encapsulate MOSFETS**

**CCMB130N10S N-Channel Power MOSFET**

$V_{(BR)DSS}$	$R_{DS(on)}$ TYP	$I_D$
100V	3.4mΩ	130A



**DESCRIPTION**

The CCMB130N10S uses advanced SGT technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

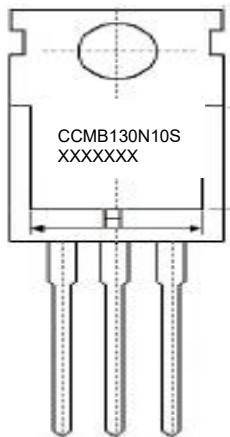
**FEATURE**

- Extremely low on-resistance  $R_{DS(on)}$
- Excellent  $Q_g \times R_{DS(on)}$  product(FOM)
- AEC Q101 qualified

**APPLICATION**

- Motor control and drive
- Battery management
- UPS (Uninterruptible Power Supplies)

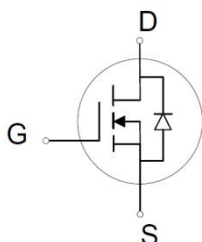
**MARKING**



CCMB130N10S =Part No.

XXXXXXX = Code

**EQUIVALENT CIRCUIT**



**ABSOLUTE MAXIMUM RATINGS(TC=25°C unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	100	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	130	A
Pulsed Drain Current <sup>1</sup>	I <sub>DM</sub>	520	A
Single Pulse Avalanche Energy <sup>2</sup>	E <sub>AS</sub>	1156	mJ
Total Power Dissipation	P <sub>D</sub>	250	W
Thermal Resistance from Junction to Case	R <sub>θJC</sub>	0.6	°C/W
Operating Junction and Storage Temperature Range	T <sub>J</sub> ,T <sub>STG</sub>	-55~+175	°C
Soldering Temperature , for 10S(1.6mm from case)	-	260	°C

Notes:

1.Current is limited by package; with a R<sub>thjc</sub> = 0.6 °C/W the chip is able to carry 188 A at 25°C.

2.EAS condition : T<sub>j</sub>=25°C,L=0.5mH,R<sub>g</sub>=25Ω,I<sub>as</sub>=68A.

# MOSFET ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise specified

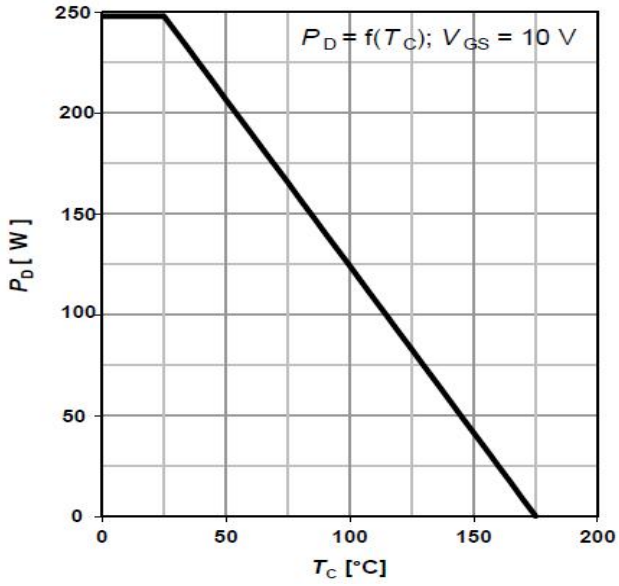
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off characteristics</b>						
Drain-Source breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	100			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			100	nA
<b>On characteristics</b>						
Gate threshold voltage <sup>3</sup>	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	2.0	3.0	4.0	V
Drain-source on-resistance <sup>3</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 65\text{ A}$		3.4	4.5	m $\Omega$
Transconductance	$g_{fs}$	$V_{DS}=10\text{ V}, I_D=65\text{ A}$		110		S
<b>Dynamic characteristics<sup>1</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$		5416	7000	pF
Output Capacitance	$C_{oss}$			2612	3500	
Reverse Transfer Capacitance	$C_{rss}$			170	300	
Gate resistance	$R_g$	$V_{GS} = 0\text{ V}, V_{DS}=0\text{ V}, f=1\text{ MHz}$		2.1		$\Omega$
<b>Switching characteristics<sup>1</sup></b>						
Total Gate Charge	$Q_g$	$V_{DD} = 50\text{ V}, V_{GS} = 10\text{ V},$ $I_D = 130\text{ A}, f = 1\text{ MHz}$		118		nC
Gate-Source Charge	$Q_{gs}$			40		
Gate-Drain Charge	$Q_{gd}$			25		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50\text{ V}, V_{GS} = 10\text{ V},$ $I_D = 130\text{ A}, R_G = 3.5\ \Omega$		26		ns
Turn-on rise time	$t_r$			18		
Turn-off delay time	$t_{d(off)}$			55		
Turn-off fall time	$t_f$			20		
<b>Drain-Source Diode Characteristics</b>						
Drain-source diode forward Voltage <sup>3</sup>	$V_{SD}$	$V_{GS} = 0\text{ V}, I_{SD} = 130\text{ A}, T_j = 25\text{ }^\circ\text{C}$			1.2	V
Continuous drain-source diode forward current <sup>2,4</sup>	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			130	A
Pulsed drain-source diode forward current	$I_{SM}$				520	A
Reverse recovery time	$t_{rr}$	$I_F=130\text{ A}, di/dt=100\text{ A/us}$		77		ns
Reverse recovery charge	$Q_{rr}$				168	

Notes :

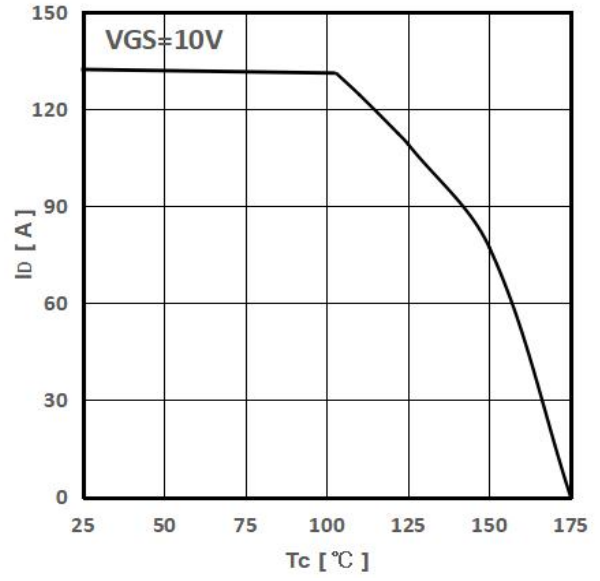
1. Guaranteed by design, not subject to production.
2. Surface Mounted on FR4 Board,  $t \leq 10\text{ sec}$ .
3. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
4. Current is limited by package; with a  $R_{thjc} = 0.6\text{ }^\circ\text{C/W}$  the chip is able to carry 188 A at 25°C.

# Typical Characteristics

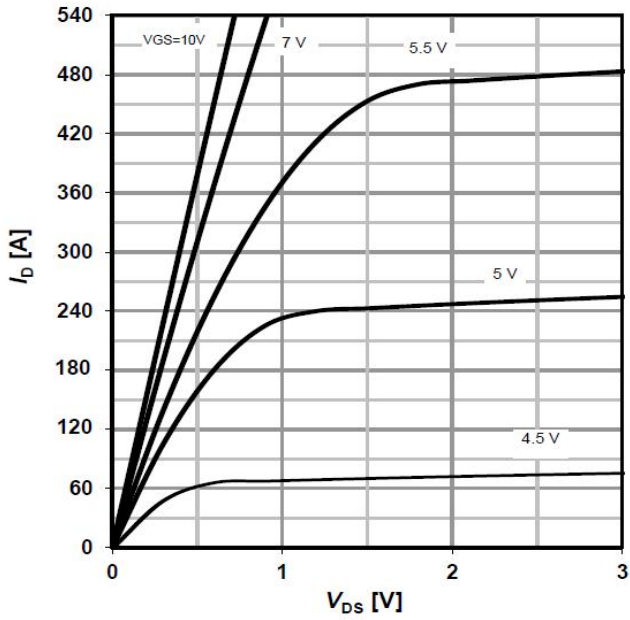
**P<sub>D</sub> -- T<sub>c</sub>**



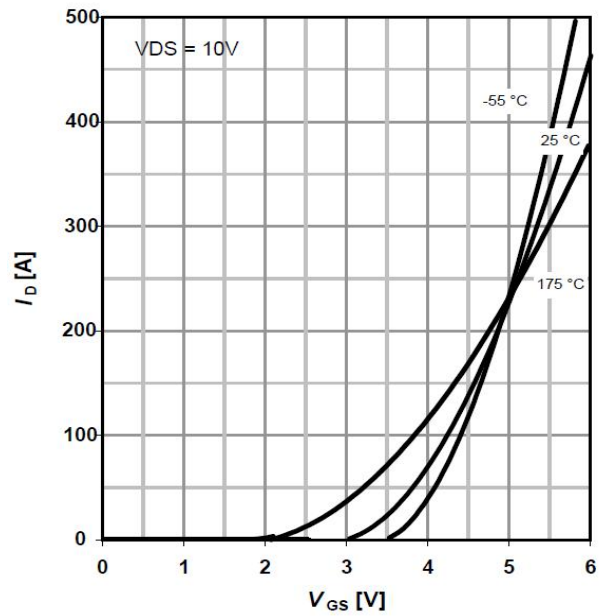
**I<sub>D</sub> -- T<sub>c</sub>**



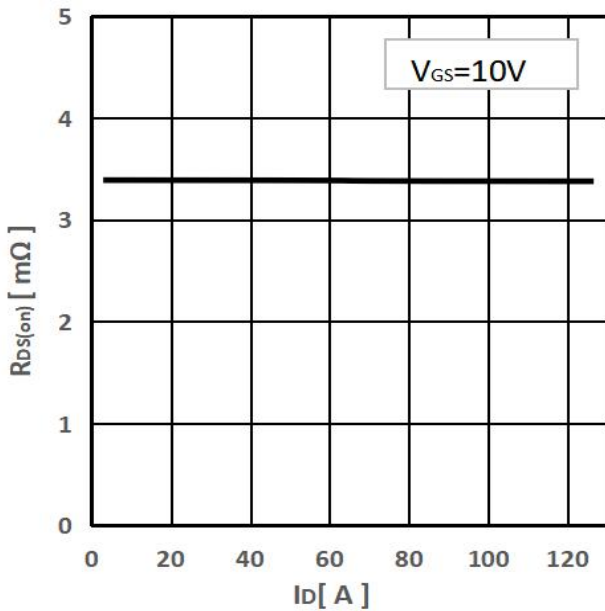
**I<sub>D</sub> -- V<sub>DS</sub>**



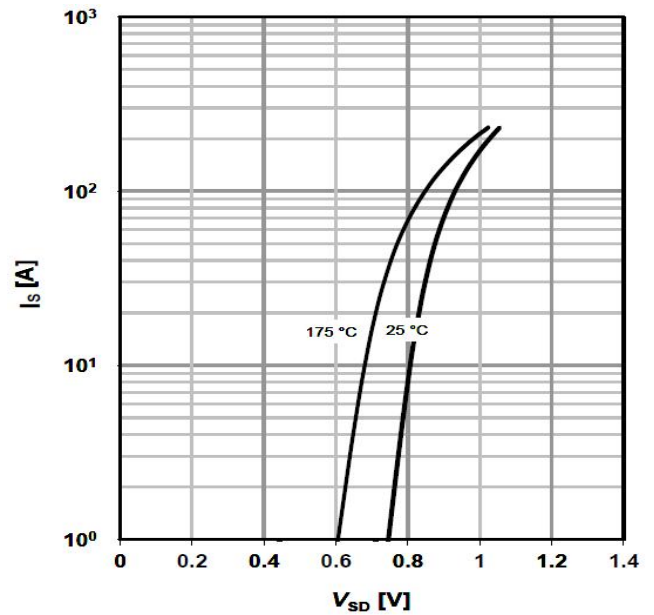
**I<sub>D</sub> -- V<sub>GS</sub>**



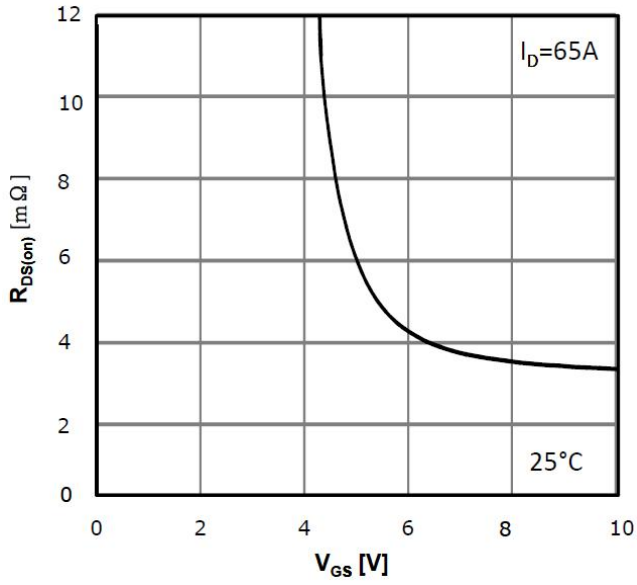
**R<sub>DS(on)</sub> -- I<sub>D</sub>**



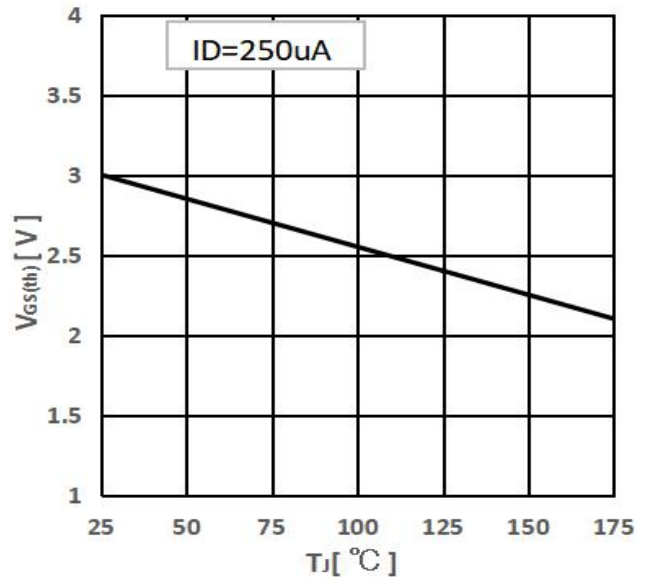
**I<sub>S</sub> -- V<sub>SD</sub>**



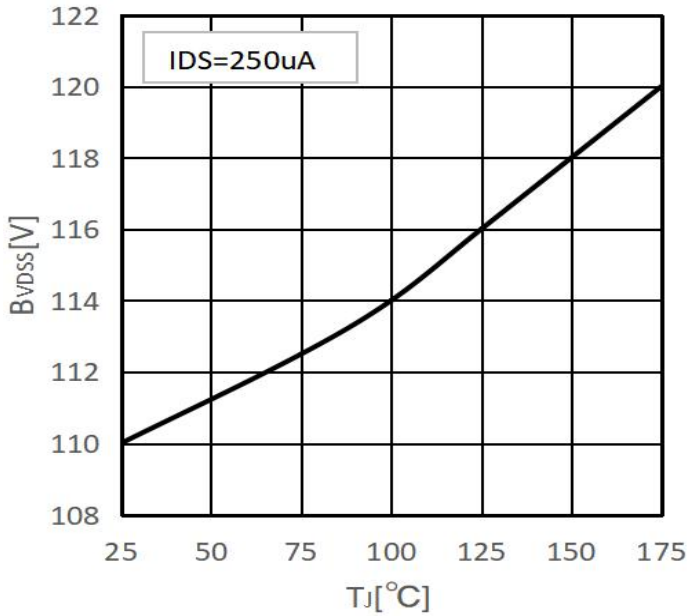
**RDS(on) -- VGS**



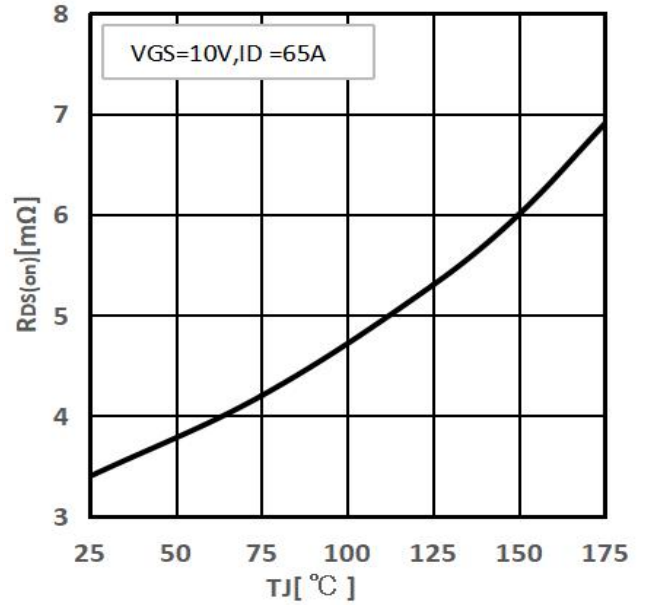
**Threshold Voltage**



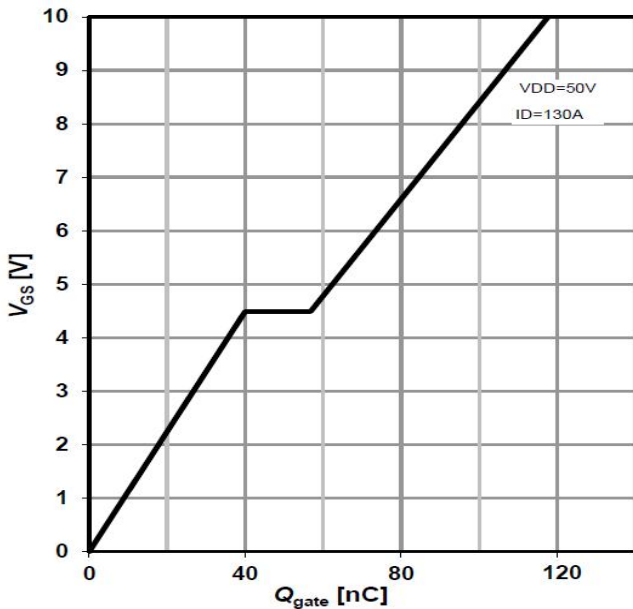
**Drain-source breakdown voltage**



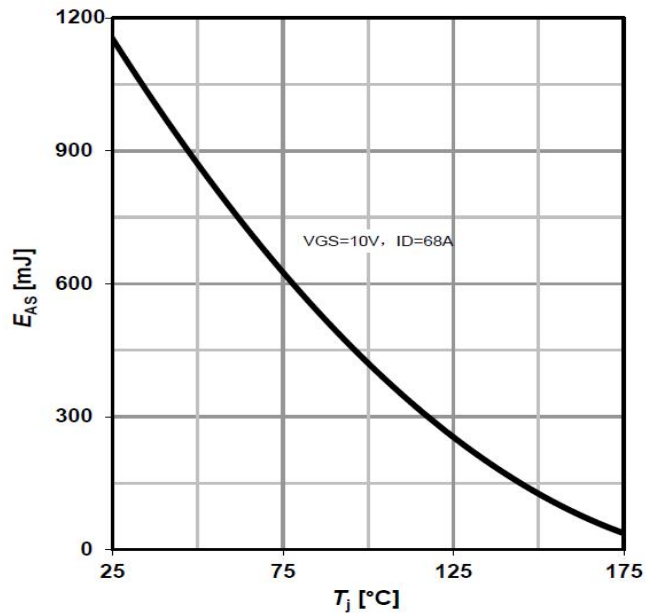
**RDS (on) -- TJ**



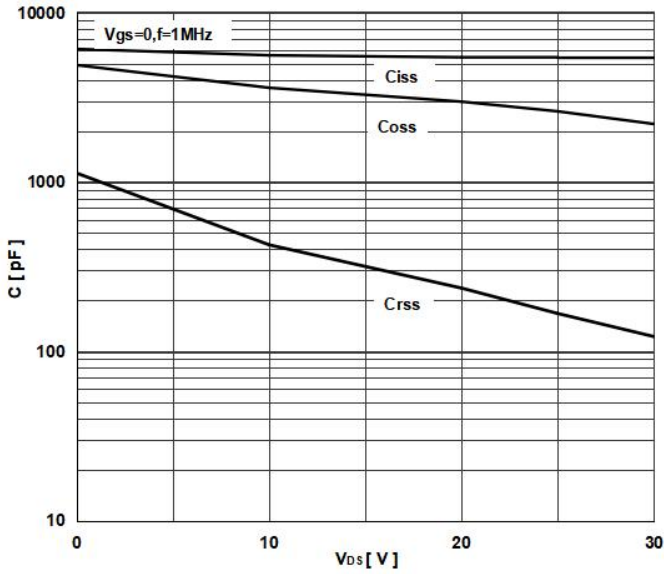
**Typ.gate charge**



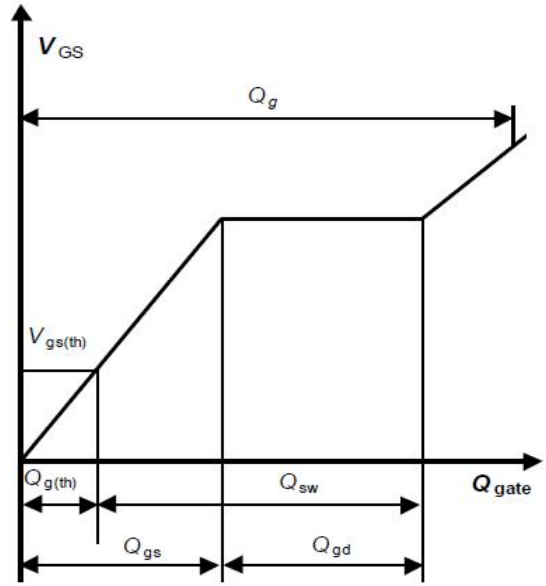
**Avalanche energy**



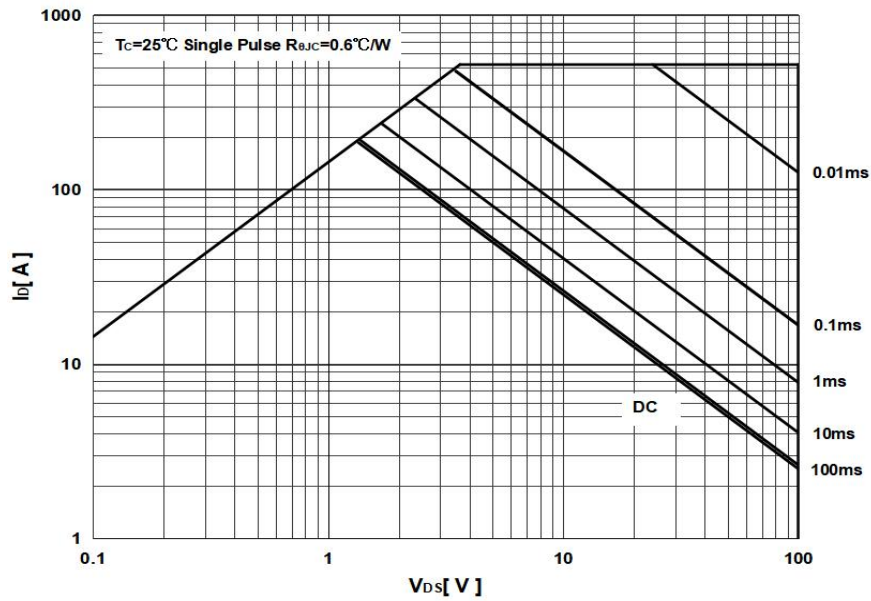
### Typ. capacitance



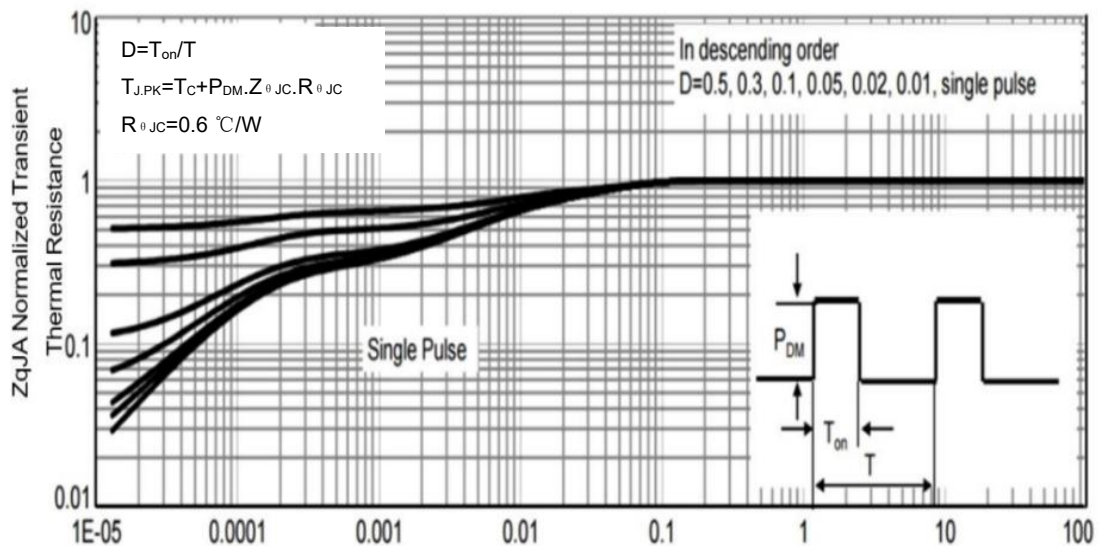
### Gate charge waveforms



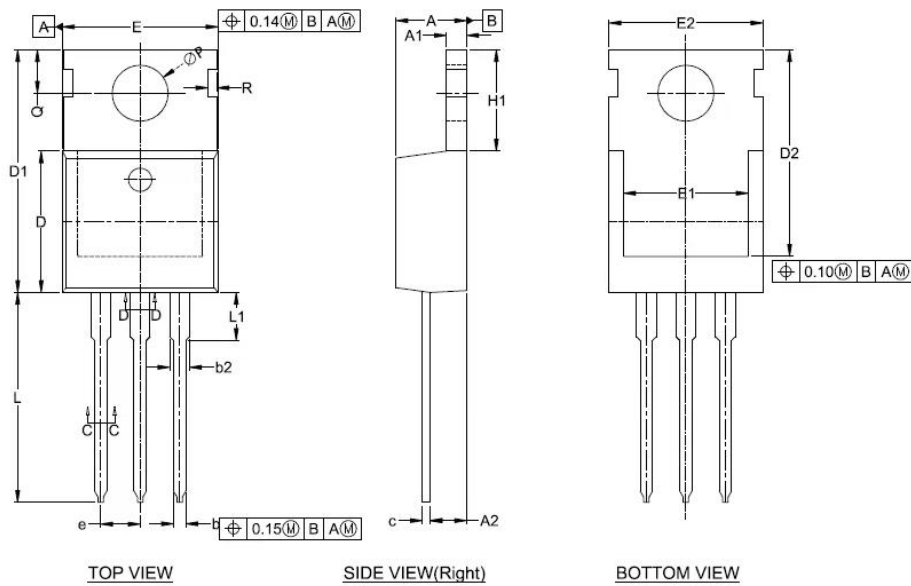
### Safe operating area



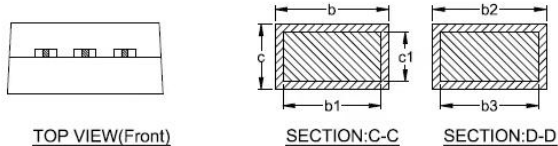
### Normalized Thermal Transient Impedance



## TO-220-C Package Outline Dimensions



DIM SYMBOL	MIN.	NOM.	MAX.
A	4.450	4.550	4.650
A1	1.240	1.340	1.440
A2	2.250	2.350	2.450
b	0.740	0.840	0.940
b1	0.700	0.800	0.900
b2	1.210	1.310	1.410
b3	1.170	1.270	1.370
c	0.440	0.540	0.640
c1	0.400	0.500	0.600
D	9.000	9.100	9.200
D1	15.420	15.620	15.820
D2	13.100	13.300	13.500
E	9.900	10.000	10.100
E1	7.800	8.000	8.200
E2	9.680	9.880	10.080
e	2.540 BSC.		
H1	6.420	6.520	6.620
L	13.300	13.500	13.700
L1	2.880	3.080	3.280
ØP	3.500	3.600	3.700
Q	2.600	2.800	3.000
R	0.590 REF.		



## TO-220-C Tubing



Tubing	Box	Box Size(mm)	Carton	Carton Size(mm)
50pcs	1000pcs	575*152*48	5000pcs	590*275*175

### NOTICE

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Date of change	Rev #	revise content
2023/12/18	A/0	/