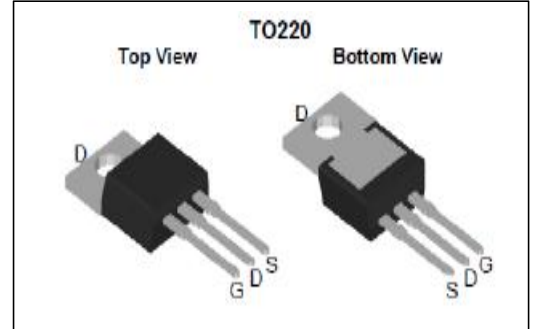




**TO-220 Plastic-Encapsulate MOSFETS**

**CCMB03N120 N-Channel Power MOSFET**

V <sub>DS</sub>	R <sub>DS(ON)</sub> (Typ.)	I <sub>D</sub>
1200 V	6.7Ω@10V	3A



**DESCRIPTION**

The CCMB03N120 provides excellent R<sub>DS(ON)</sub> with low gate charge. It can be used in a wide variety of applications.

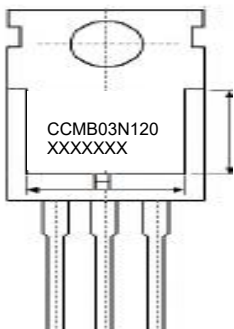
**FEATURES**

- RoHS Compliant
- Low ON Resistance
- Low Gate Charge
- Peak Current vs Pulse Width Curve
- Inductive Switching Curves
- AEC Q101 Qualified

**APPLICATIONS**

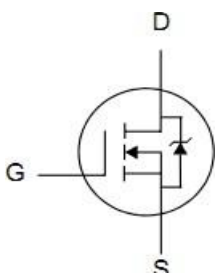
- SMPS
- Adaptor
- Electric welder

**MARKING**



CCMB03N120 =Part No.  
XXXXXXX = Code

**EQUIVALENT CIRCUIT**



**ABSOLUTE MAXIMUM RATINGS( $T_c=25^{\circ}\text{C}$  unless otherwise noted)**

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	1200	V
Gate-Source Voltage	$V_{GS}$	$\pm 30$	V
Continuous Drain Current $T_c=25^{\circ}\text{C}$	$I_D$	3	A
Continuous Drain Current $T_c=125^{\circ}\text{C}$	$I_D$	1.8	A
Pulsed Drain Current <sup>1</sup>	$I_{DM}$	12	A
Single Pulse Avalanche Energy <sup>2</sup>	EAS	31	mJ
Total Power Dissipation	$P_D$	100	W
Thermal Resistance from Junction to Case <sup>3</sup>	$R_{\theta JC}$	1.5	$^{\circ}\text{C}/\text{W}$
Thermal Resistance from Junction to Ambient <sup>4</sup>	$R_{\theta JA}$	120	$^{\circ}\text{C}/\text{W}$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55~ +175	$^{\circ}\text{C}$
Soldering Temperature , for 10S(1.6mm from case)	-	260	$^{\circ}\text{C}$

## Notes:

- 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2.Start  $T_J = 25^{\circ}\text{C}$ ,  $L = 10\text{mH}$ ,  $I_{AS} = 2.5\text{A}$ ,  $V_{GS} = 10\text{V}$ .
- 3.Water cooled heatsink,  $P_D$  adjusted for a peak junction temperature of  $175^{\circ}\text{C}$ .
- 4.1 cubic foot chamber, free air.

# MOSFET ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise specified

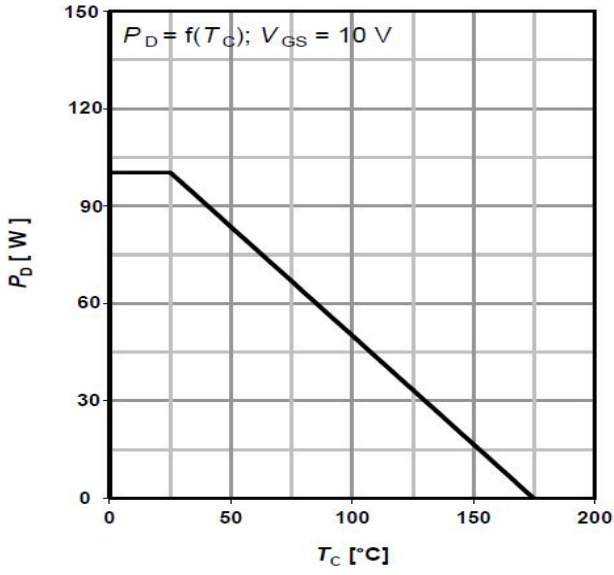
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	1200			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 1200V, V_{GS} = 0V, T_J = 25^\circ C$		1.18	5	$\mu A$
		$V_{DS} = 1200V, V_{GS} = 0V, T_J = 125^\circ C$		1.7	10	
		$V_{DS} = 1200V, V_{GS} = 0V, T_J = 175^\circ C$		35	50	
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 100$	nA
<b>On characteristics <sup>1</sup></b>						
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	3	3.7	5	V
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 1.5A$		6.7	9	$\Omega$
Transconductance	$g_{fs}$	$V_{DS} = 15V, I_D = 1.5A$		3.8		S
<b>Dynamic characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 25V, V_{GS} = 0V, f = 1MHz$		856		$\mu F$
Output Capacitance	$C_{oss}$			60		
Reverse Transfer Capacitance	$C_{rss}$			7.3		
Gate resistance	$R_g$	$V_{GS} = 0V, V_{DS} = 0V, f = 1MHz$		3.9		$\Omega$
<b>Switching characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DD} = 960V, V_{GS} = 10V, I_D = 3A$		19.7		nC
Gate-Source Charge	$Q_{gs}$			7.5		
Gate-Drain Charge	$Q_{gd}$			5.4		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 600V, V_{GS} = 10V, I_D = 3A, R_G = 10\Omega$		15.1		ns
Turn-on rise time	$t_r$			19.4		
Turn-off delay time	$t_{d(off)}$			25.6		
Turn-off fall time	$t_f$			76.2		
<b>Drain-source Diode characteristics <sup>1</sup></b>						
Diode Forward Voltage	$V_{SD}$	$V_{GS} = 0V, I_{SD} = 3A, T_J = 25^\circ C$			1.5	V
Continuous Source Current	$I_S$	$T_C = 25^\circ C$			3	A
Pulsed drain-source diode forward current	$I_{SM}$	—			12	A
Reverse recovery time	$T_{rr}$	$I_F = 3A, di/dt = 100A/\mu s$		526		ns
Reverse recovery charge	$Q_{rr}$			2000		nC

Note :

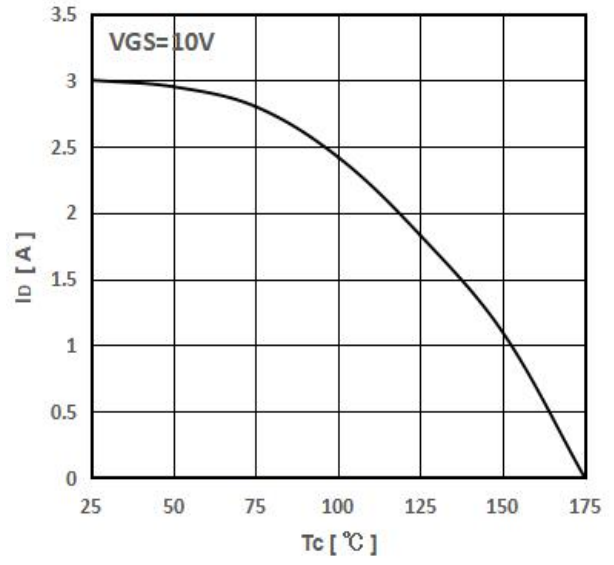
1. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

# Typical Characteristics

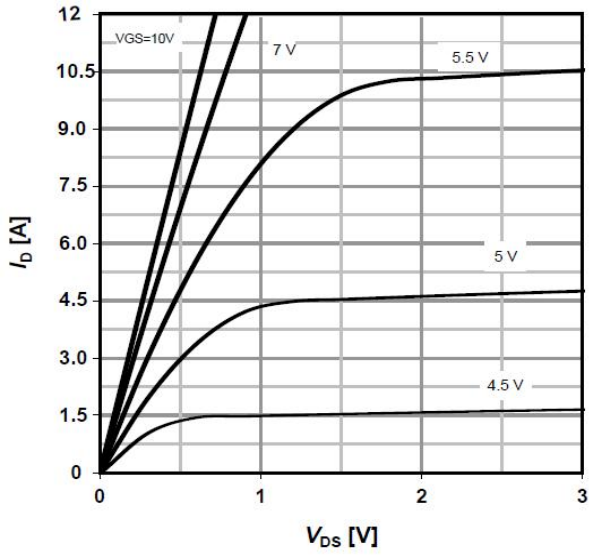
PD -- Tc



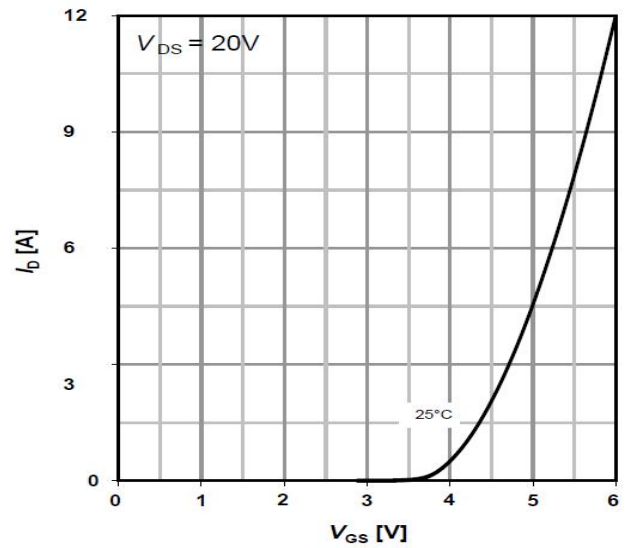
ID -- Tc



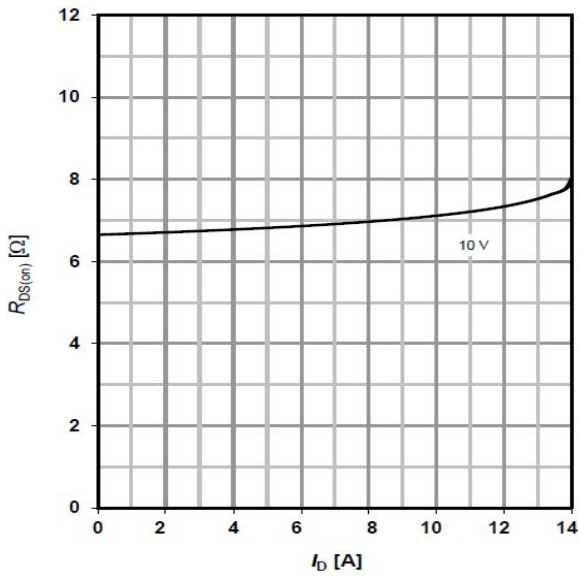
ID -- VDS



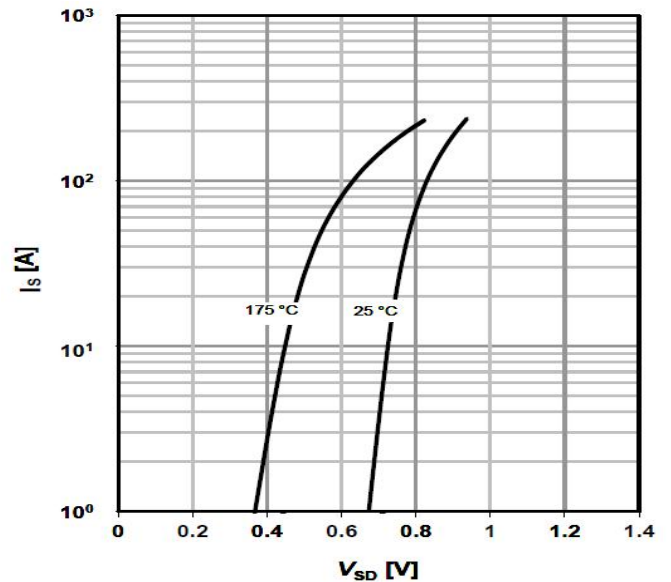
ID -- VGS



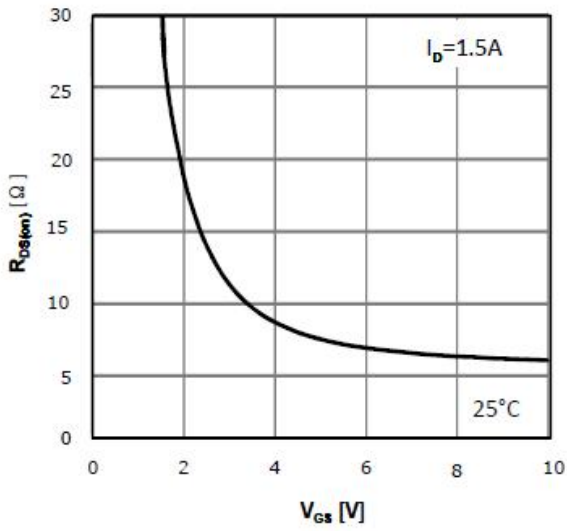
RDS(on) -- ID



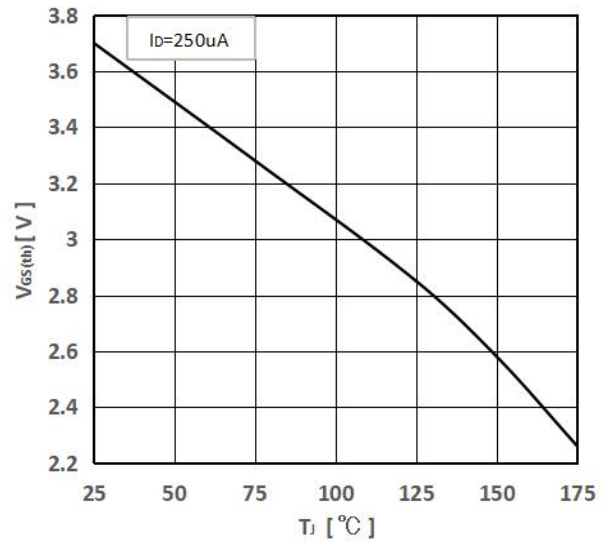
IS -- VSD



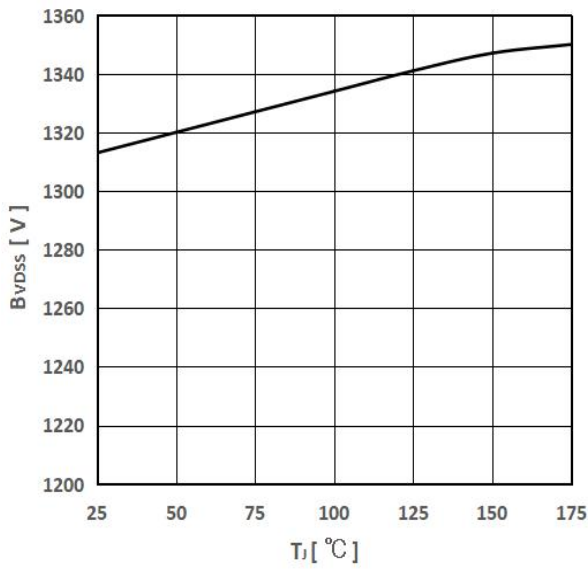
**RDS(on) -- VGS**



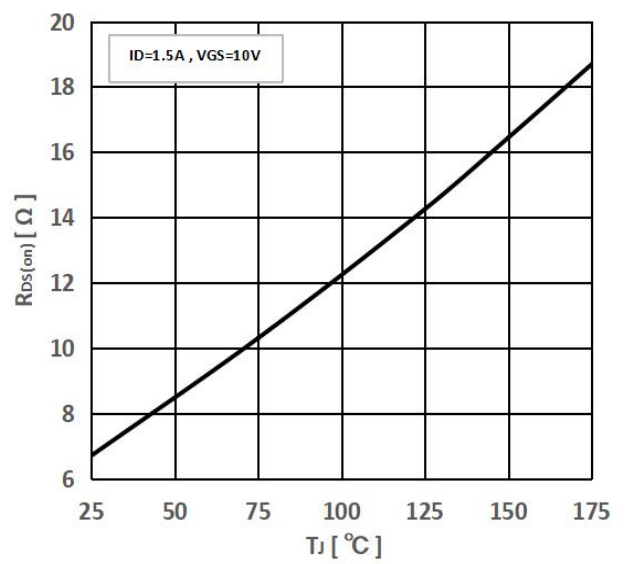
**Threshold Voltage**



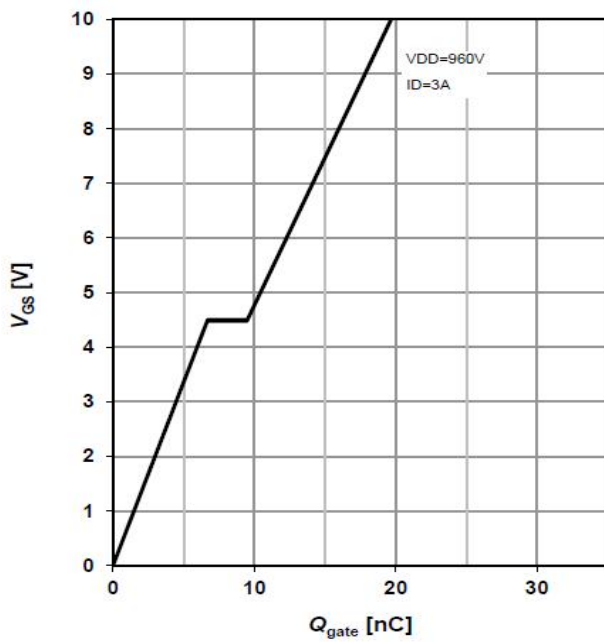
**Drain-source breakdown voltage**



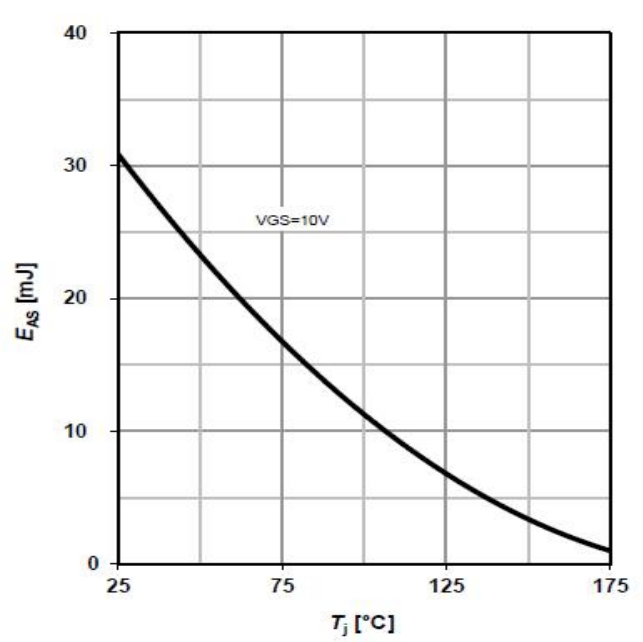
**RDS (on) -- Tj**



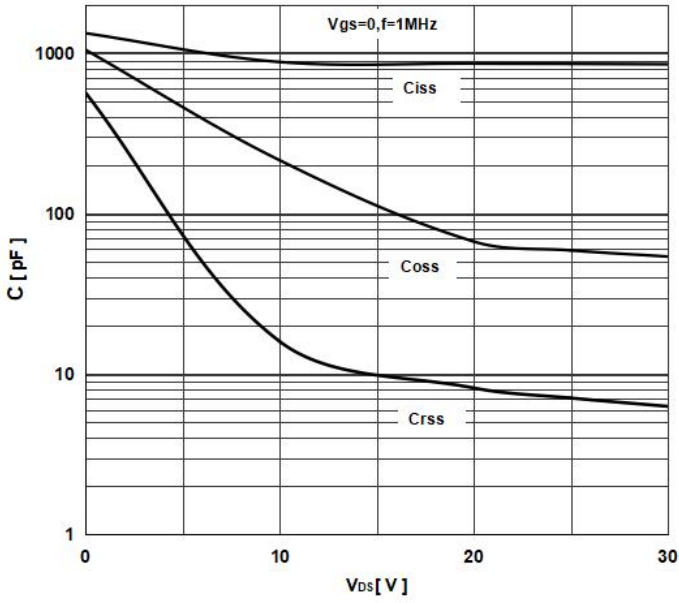
**Typ.gate charge**



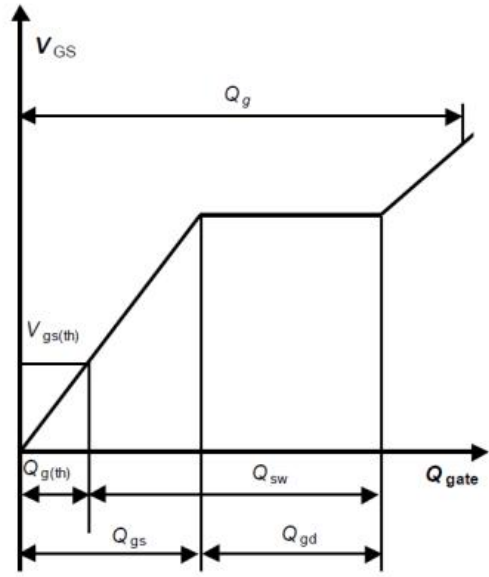
**Avalanche energy**



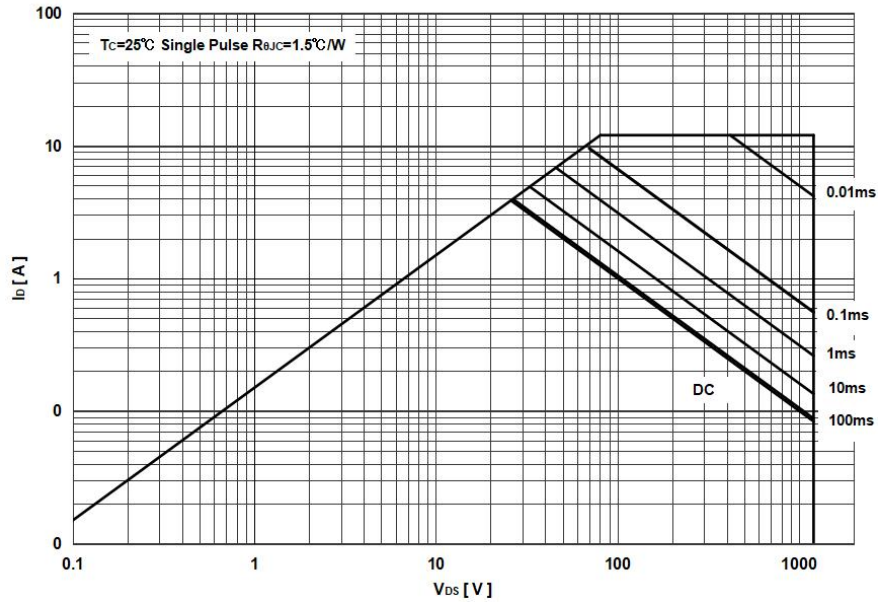
### Typ. capacitance



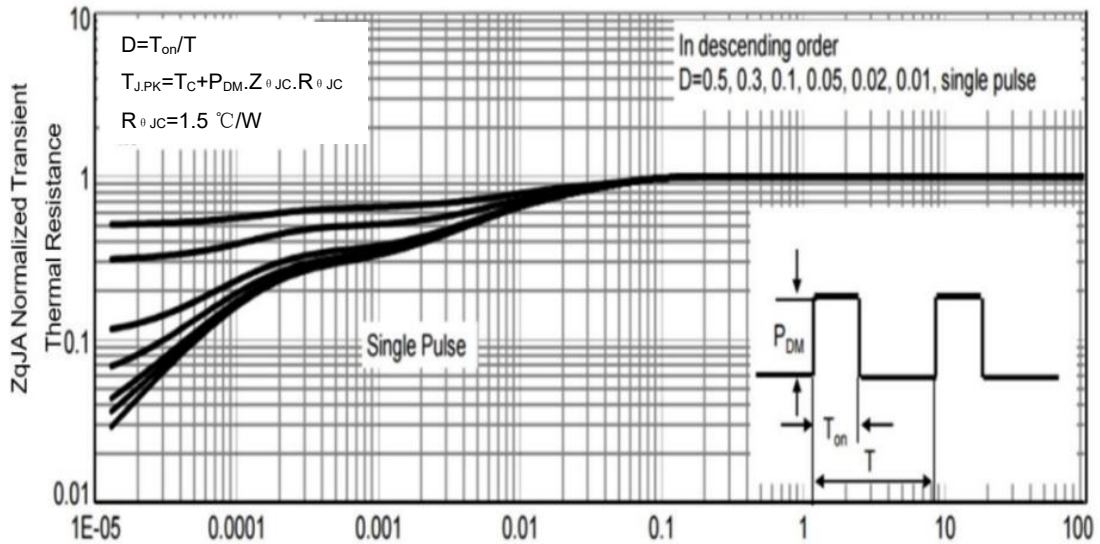
### Gate charge waveforms



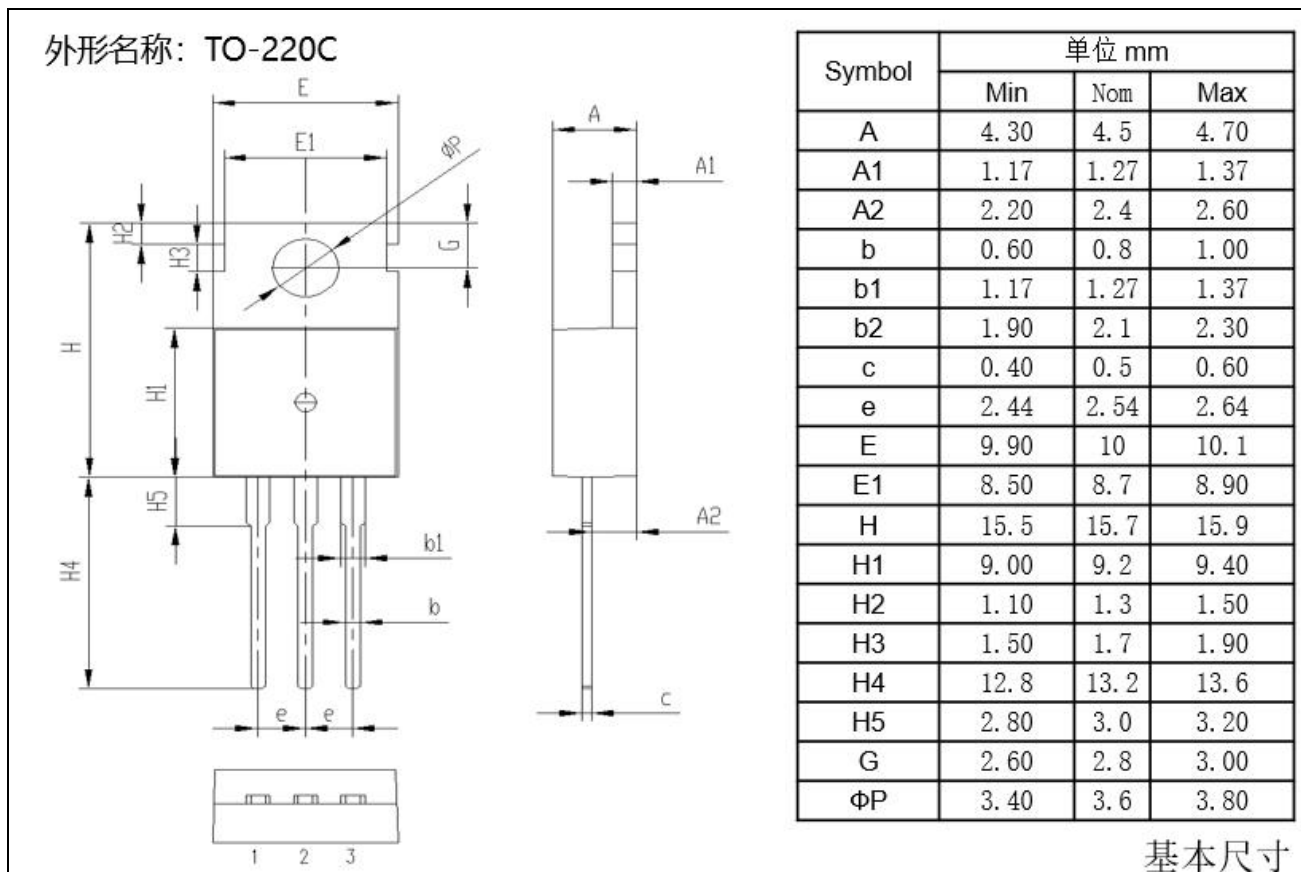
### Maximum Forward Biased Safe Operating Area



### Normalized Thermal Transient Impedance



## TO-220 Package Outline Dimensions



## TO-220-2L 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
2022/11/22	A/0	/