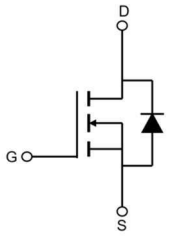
AP200N04

N-Channel Enhancement Mosfet

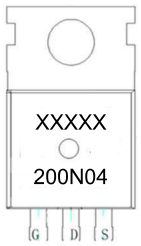
DATA SHEET

Feature

- 40V,160A
  $R_{DS(ON)}$ <2.8mΩ @V_{GS}=10V TYP:2.4 mΩ
  $R_{DS(ON)}$ <4.0mΩ @V_{GS}=4.5V TYP:3.2mΩ
- Advanced Trench Technology
- Lead free product is acquired
- Excellent $R_{DS(ON)}$ and Low Gate Charge



Schematic Diagram



Marking and pin assignment

Application

- PWM applications
- Load Switch
- Power management

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
200N04	AP200N04	TO-220		-	1000

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Continuous Drain Current (T_c =25℃)	I_D	160	A
Continuous Drain Current (T_c =100℃)	I_D	112	A
Pulsed Drain Current (1)	I_{DM}	520	A
Single Pulsed Avalanche Energy (2)	E_{AS}	245	mJ
Power Dissipation	P_D	180	W
Thermal Resistance from Junction to Case(4)	$R_{\theta JC}$	0.83	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

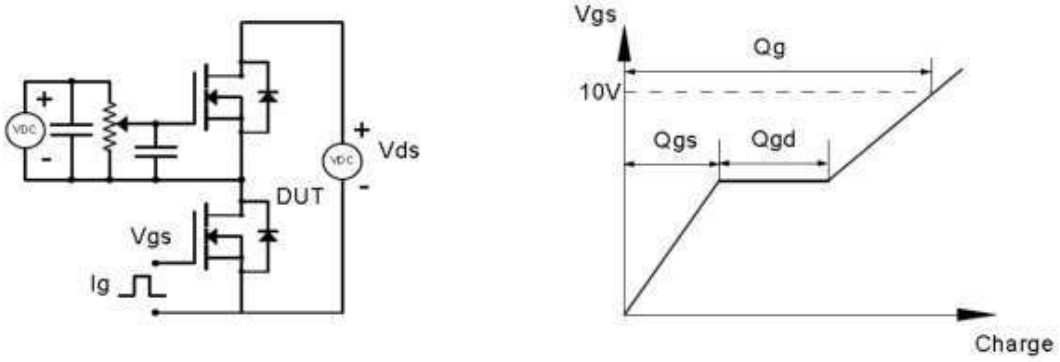
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	40	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =40V, V_{GS} = 0V	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±20V,V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage(3)	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	1	1.5	2.2	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =10V, I_D =50A	-	2.4	2.8	mΩ
		V_{GS} =4.5V, I_D =30A	-	3.2	4.0	
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =20V, V_{GS} =0V, f =1MHz	-	6260	-	pF
Output Capacitance	C_{oss}		-	523	-	
Reverse Transfer Capacitance	C_{rss}		-	727	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, I_D=30A, R_L=1Ω V_{GS}=10V, R_G=3Ω	-	16.8	-	ns
Turn-on rise time	t_r		-	38.1	-	
Turn-off delay time	$t_{d(off)}$		-	116.4	-	
Turn-off fall time	t_f		-	33.4	-	
Total Gate Charge	Qg	VDS=20V, ID=30A, VGS=10V	-	129.6	-	nC
Gate-Source Charge	Qgs		-	20.3	-	
Gate-Drain Charge	Qgd		-	27.4	-	
Source-Drain Diode characteristics						
Diode Forward voltage(3)	V_{DS}	V_{GS} =0V, I_S=10A	-	-	1.2	V
Diode Forward current(4)	I_S		-	-	160	A
Body Diode Reverse Recovery Time	trr	T_J=25°， IF=30A,di/dt=100A/us		23.5		ns
Body Diode Reverse Recovery Charge	Qrr	T_J=25°， IF=30A,di/dt=100A/us		12.8		nc

Notes:

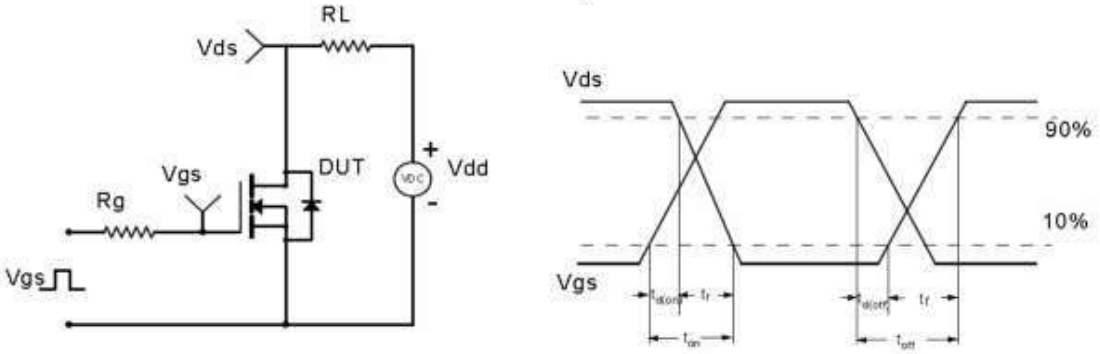
1. Repetitive Rating: pulse width limited by maximum junction temperature
2. EAS Condition:T_J=25℃,V_{DD}=20V,R_G=25Ω,L=0.5mH
3. Pulse Test: pulse width≤300μs, duty cycle≤2%
4. Surface Mounted on FR4 Board,t≤10 sec

Test Circuit & Waveform

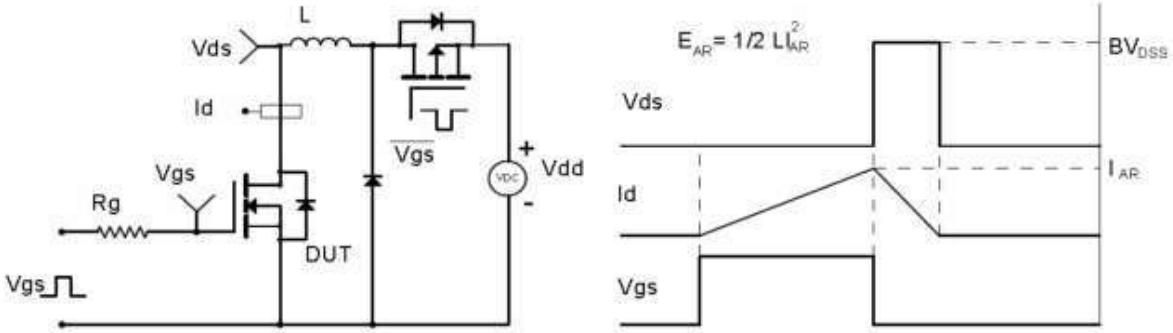
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

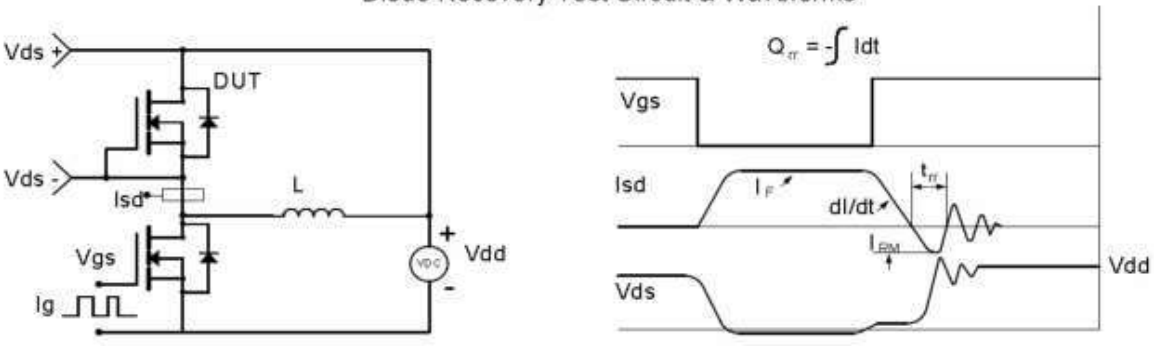


Fig1. Power Dissipation Derating Curve

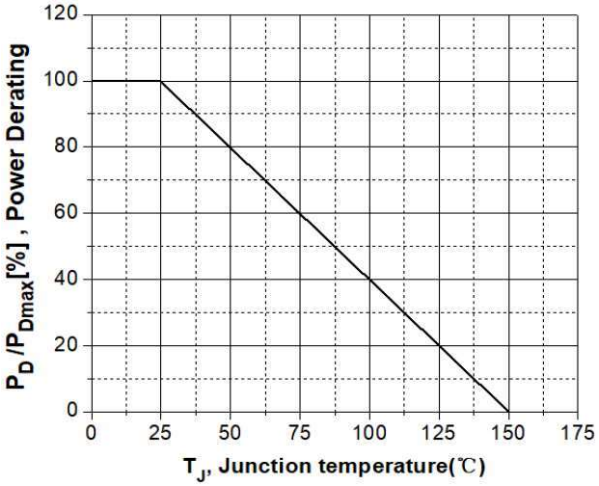


Fig2. Avalanche Energy Derating Curve vs. Junction Temperature

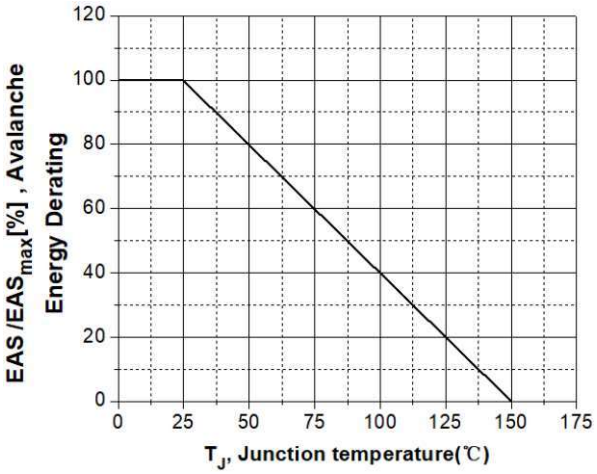


Fig3. Typical Output Characteristics@Tj= 125℃

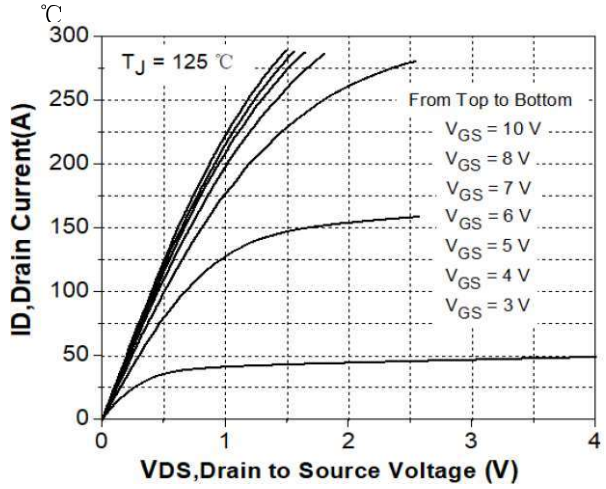


Fig4. Transconductance vs. Drain Current @Ti= -25/25/75/125℃

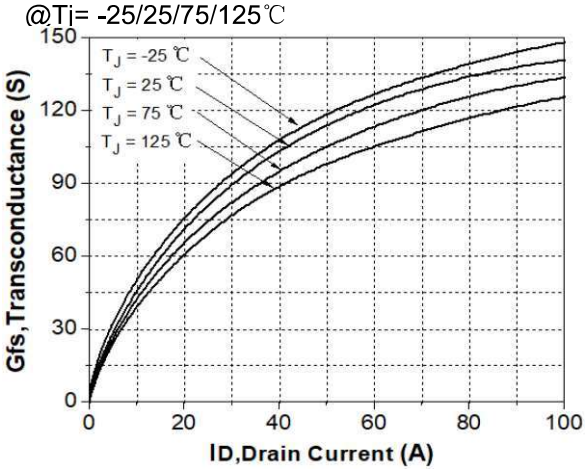


Fig5. Typical Transfer Characteristics @Ti= -25/25/75/125℃

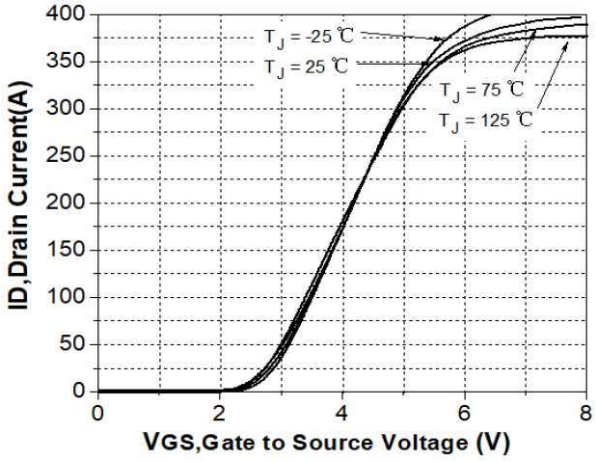


Fig6. Static Drain - Source On - State Resistance vs. Drain Current @Ti= -25℃

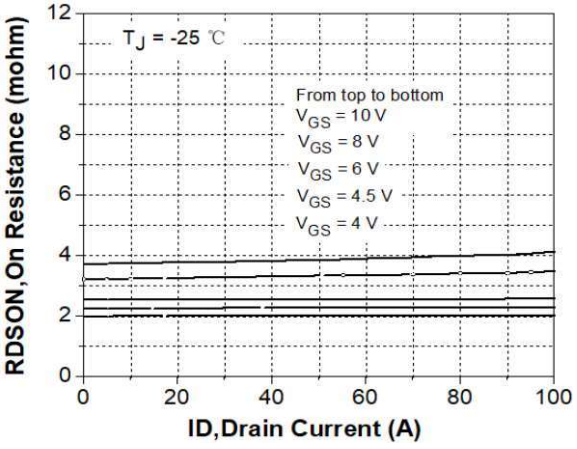


Fig7. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 25℃

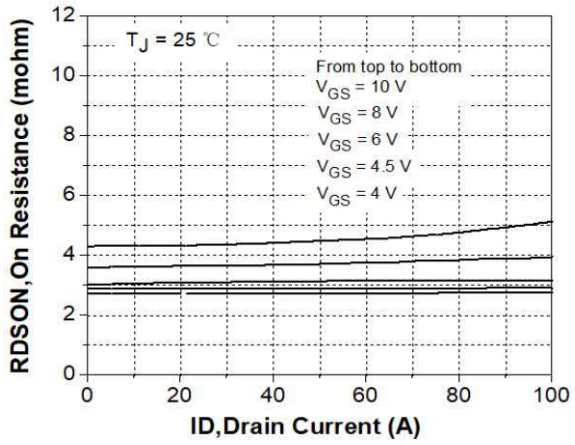


Fig8. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 75℃

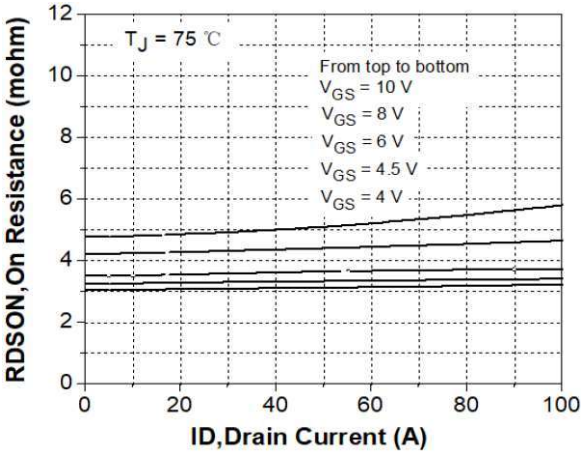


Fig9. Static Drain - Source On - State Resistance vs. Drain Current @Tj= 125℃

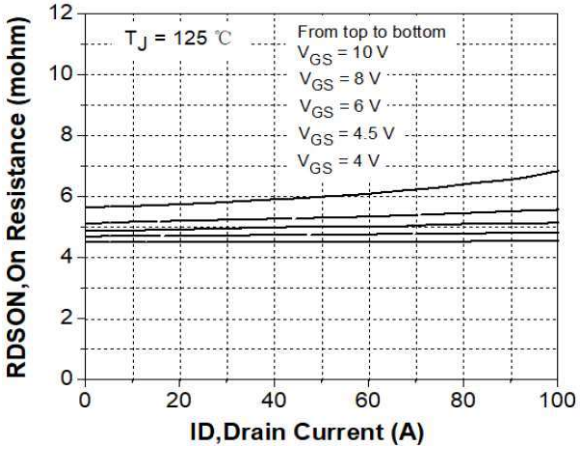


Fig10. Gate Charge Characteristics

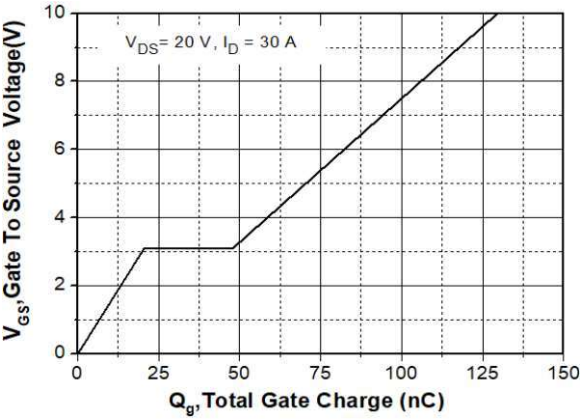


Fig11. Breakdown Voltage vs. Junction Temperature

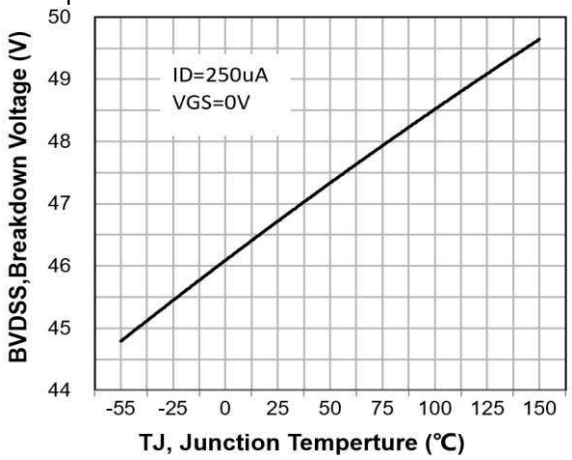


Fig12. Gate Threshold Voltage vs. Junction Temperature

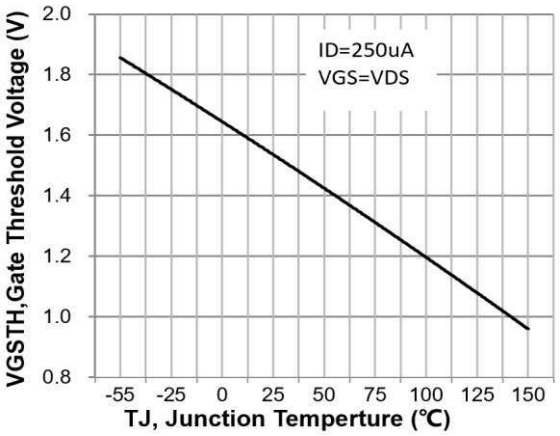


Fig13. Safe Operating Area

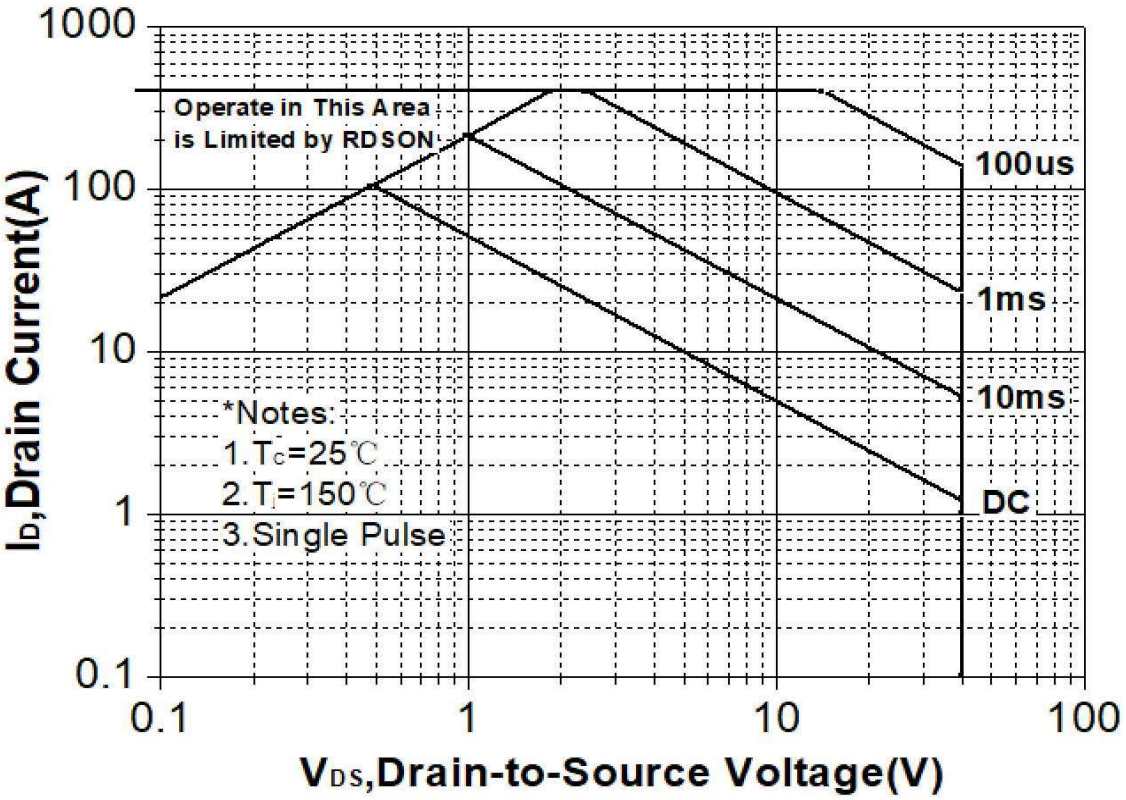


Fig14. Transient Thermal Response Curve

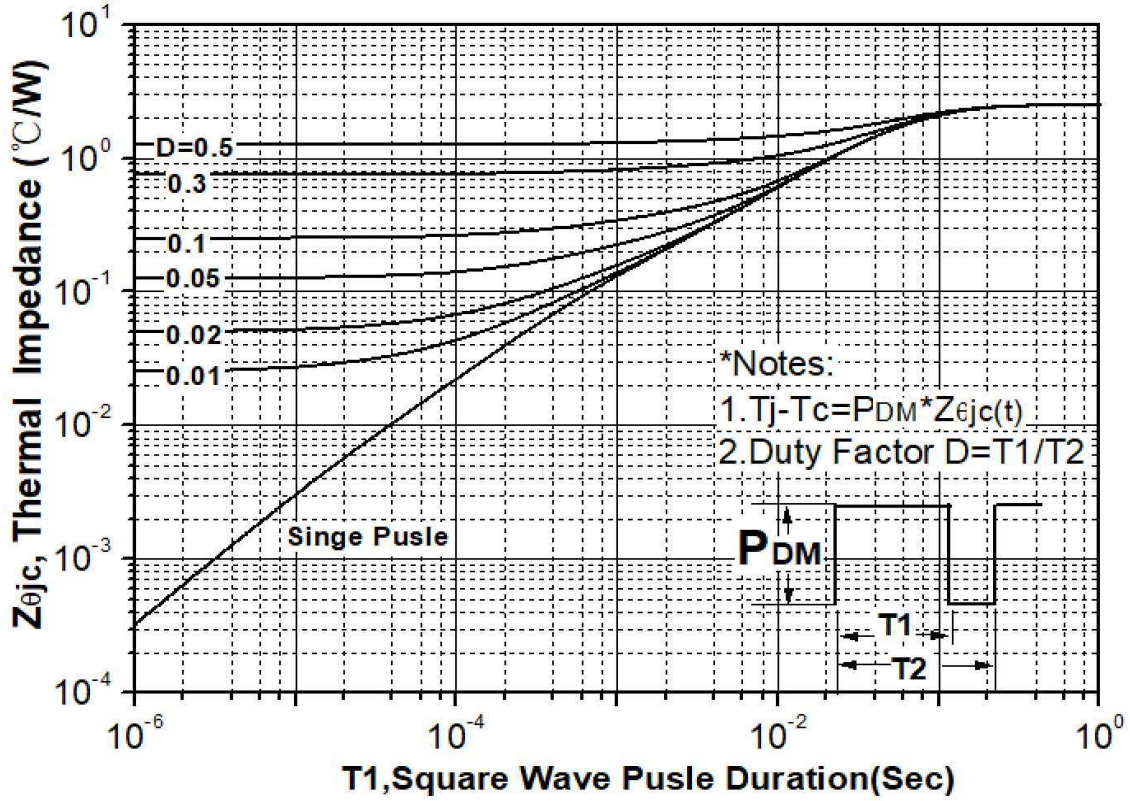


Fig15. On-Resistance Variation vs. Junction

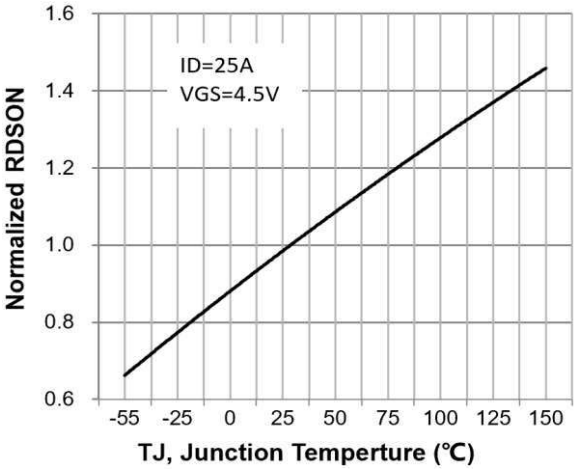


Fig16. Maximum Drain Current vs. Case Temperature

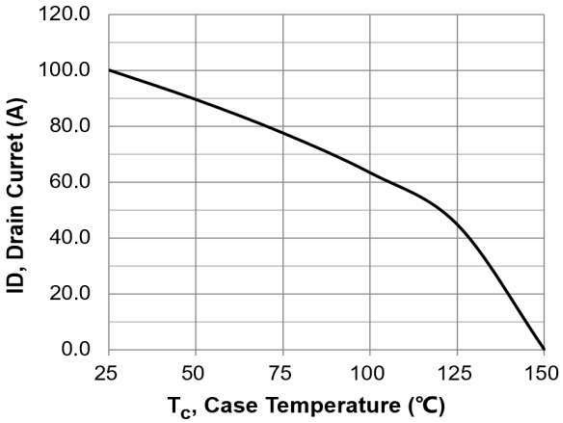


Fig17. Body Diode Forward Voltage vs. Reverse Drain Current

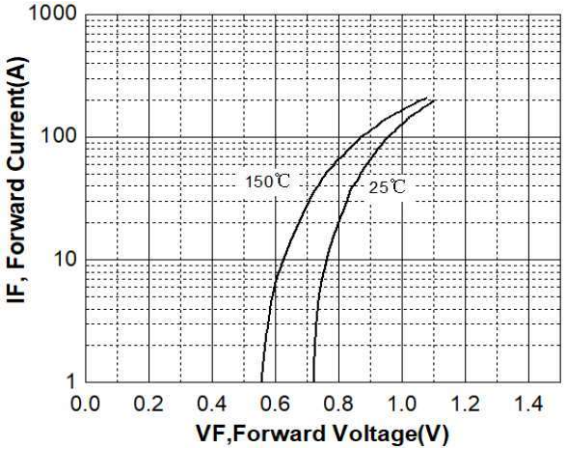
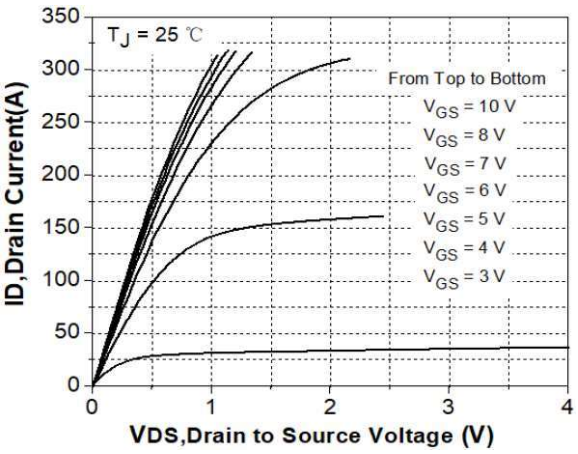
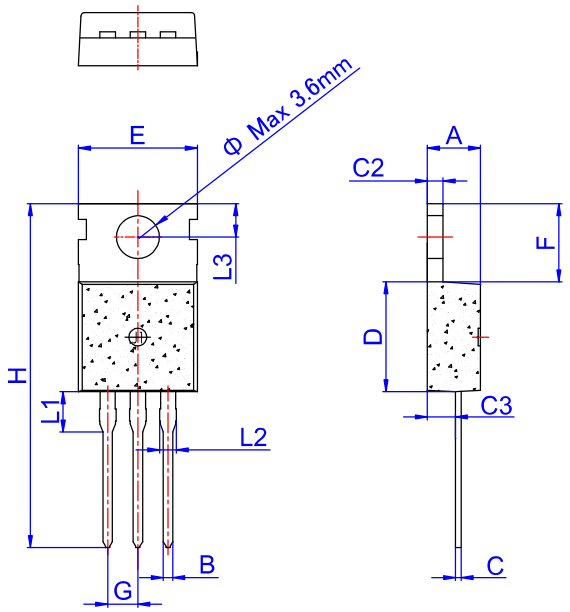


Fig18. Typical Output Characteristics@Tj= 25℃



TO-220C Package Information



TO-220C

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.173		0.181
B	0.70		0.90	0.028		0.035
C	0.45		0.60	0.018		0.024
C2	1.23		1.32	0.048		0.052
C3	2.20		2.60	0.087		0.102
D	8.90		9.90	0.350		0.390
E	9.90		10.3	0.390		0.406
F	6.30		6.90	0.248		0.272
G		2.54			0.1	
H	28.0		29.8	1.102		1.173
L1		3.39			0.133	
L2	1.14		1.70	0.045		0.067
L3	2.65		2.95	0.104		0.116
Φ		3.6			0.142	