

AP80N07D

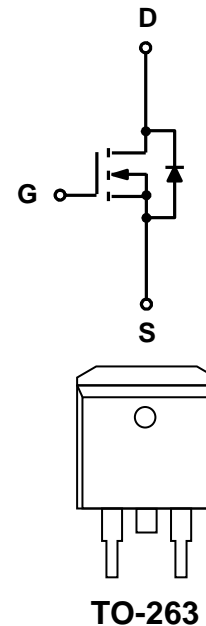
N-Channel Enhancement Mosfet

Features

- 70V,80A
 $R_{DS(ON)} < 9.0m\Omega$ $V_{GS}=10V$ TYP:7.3m Ω
- Extremely Low $R_{DS(ON)}$
- Good stability
- Advanced Trench technology

Applications

- UPS
- Power switch
- General purpose appliances



Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
80N07D	AP80N07D	TO-263	-	-	800

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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	70	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C=25^\circ\text{C}$) ^(1,3)	I_D	80	A
Continuous Drain Current ($T_C=100^\circ\text{C}$) ^(1,3)	I_D	52	A
Pulsed Drain Current ^(1,2,3)	I_{DM}	320	A
Single Pulsed Avalanche Energy ($V_{DD}=30V, L=1.0mH$)	E_{AS}	170	mJ
Drain Power Dissipation	P_D	120	W
Thermal Resistance from Junction to Case ⁽²⁾	$R_{\theta JC}$	0.9	$^\circ\text{C}/\text{W}$
Thermal Resistance- Junction to Ambient ⁽²⁾	$R_{\theta JA}$	52	$^\circ\text{C}/\text{W}$
Junction Temperature	T_J	175	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55~ +175	$^\circ\text{C}$

Notes:

1. Pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$
2. Surface Mounted on minimum footprint pad area.
3. Limited by bonding wire

MOSFET ELECTRICAL CHARACTERISTICS($T_a=25^\circ\text{C}$ unless otherwise noted)

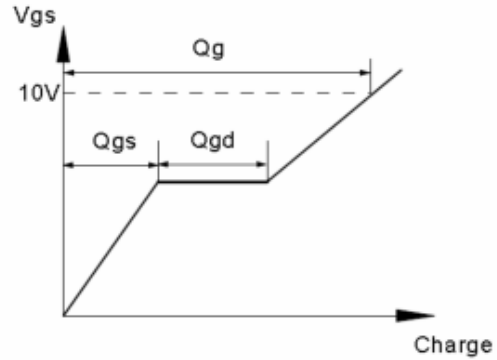
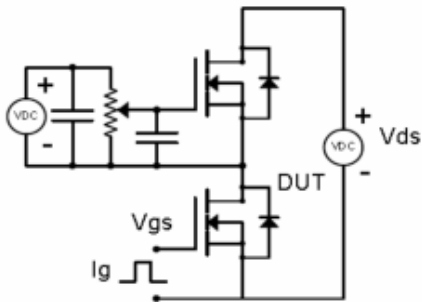
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	70	-	-	V
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 70V, V_{GS} = 0V$	-	-	1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	3.0	4.0	V
Drain-source on-resistance ^(a)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 30A$	-	7.3	9.0	m Ω
Forward Transconductance	G_{fs}	$V_{DS} = 10V, I_D = 20A$	15			S
Dynamic characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 30V, V_{GS} = 0V, f = 1.0MHz$	-	3900	-	pF
Output Capacitance	C_{oss}		-	230	-	
Reverse Transfer Capacitance	C_{rss}		-	220	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 30V, I_D = 20A, R_G = 6.0\Omega,$ $V_{GS} = 10V$	-	19	-	ns
Turn-on rise time	t_r		-	50	-	
Turn-off delay time	$t_{d(off)}$		-	60	-	
Turn-off fall time	t_f		-	40	-	
Total Gate Charge	Q_g	$V_{DS} = 30V, I_D = 20A,$ $V_{GS} = 10V$	-	80	-	nC
Gate-Source Charge	Q_{gs}		-	18	-	
Gate-Drain Charge	Q_{gd}		-	20	-	
Source-Drain Diode characteristics						
Diode Forward voltage ^(a)	V_{SD}	$T_C = 25^\circ\text{C}, V_{GS} = 0V, I_S = 20A$	-	-	1.2	V
Diode Forward current	I_S	$T_C = 25^\circ\text{C}$	-	-	80	A
Body Diode Reverse Recovery Time	t_{rr}	$T_C = 25^\circ\text{C}, I_F = 20A, di/dt = 100A/\mu s$		33		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$T_C = 25^\circ\text{C}, I_F = 20A, di/dt = 100A/\mu s$		48		nc

Notes:

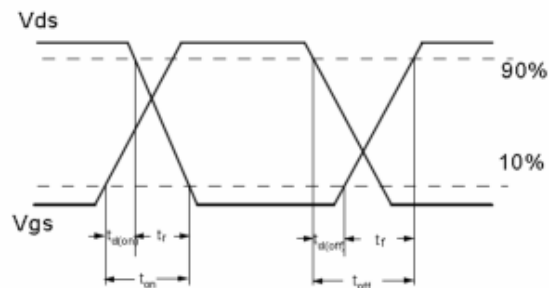
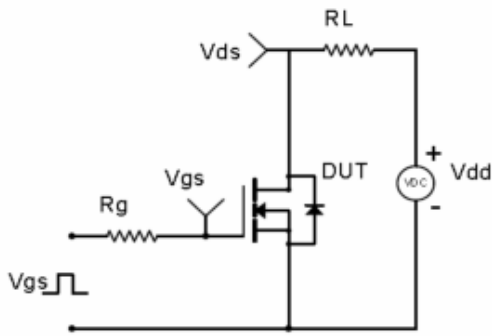
- a) : Pulse test ; pulse width $\leq 300 \mu s$, duty cycle $\leq 2\%$
b) : Guaranteed by design, not subject to production testing

Test Circuit & Waveform

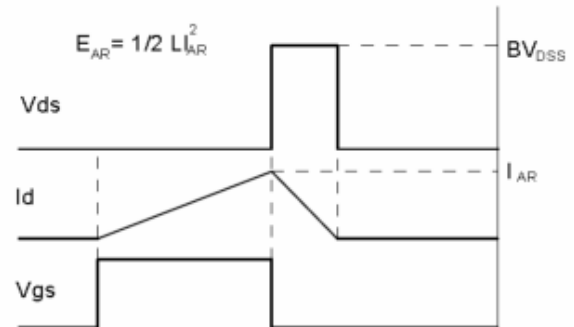
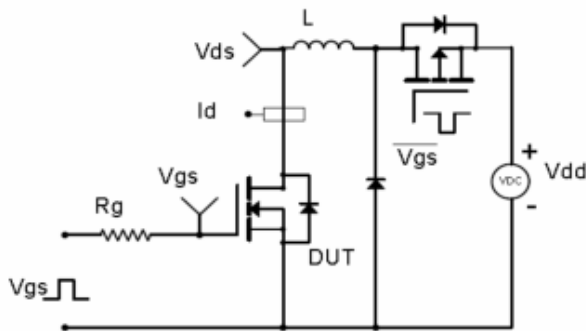
Gate Charge Test Circuit & Waveform



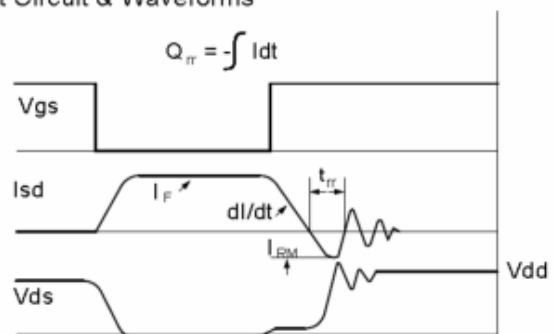
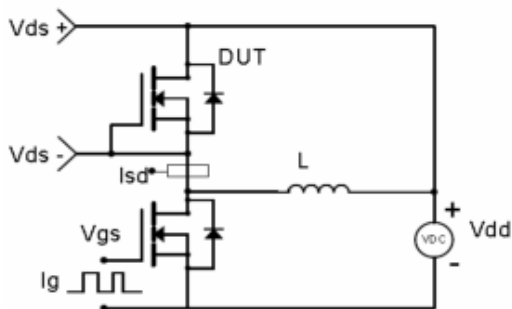
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Typical Performance Characteristics

Fig.1 Power Dissipation Derating Curve

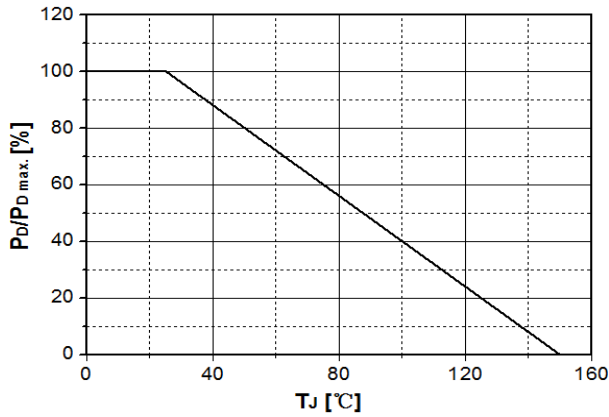


Fig.2 Avalanche Energy Derating Curve vs. Junction Temperature

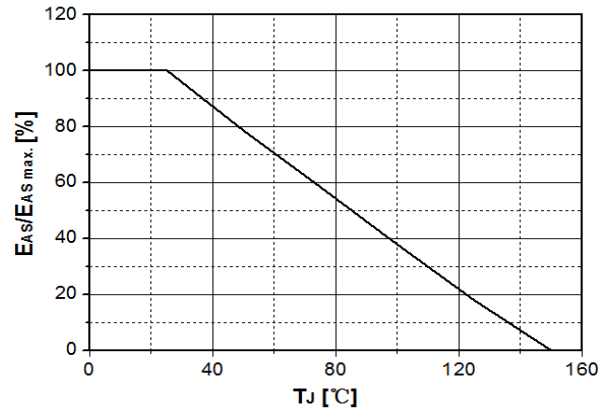


Fig.3 Typical Output Characteristics

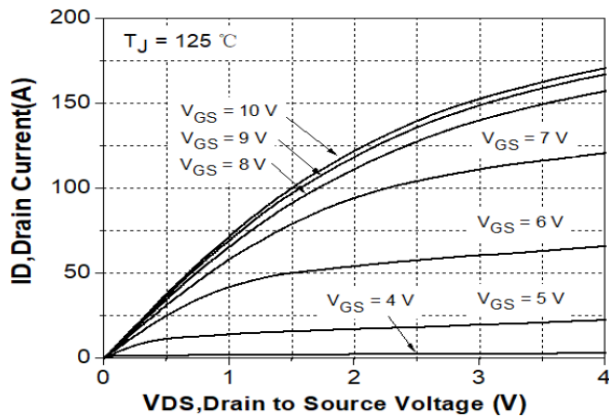


Fig. 4 Transconductance vs. Drain Current

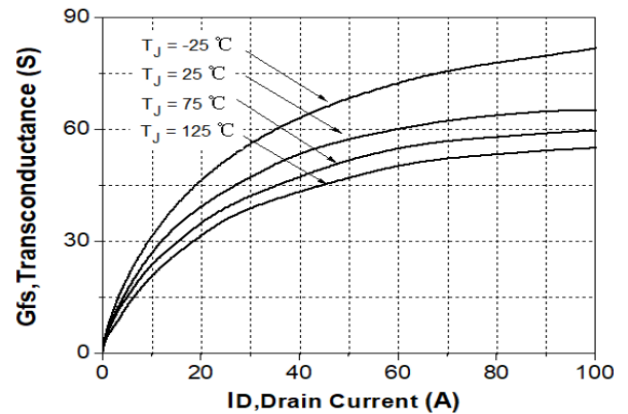


Fig.5 Typical Transfer Characteristics

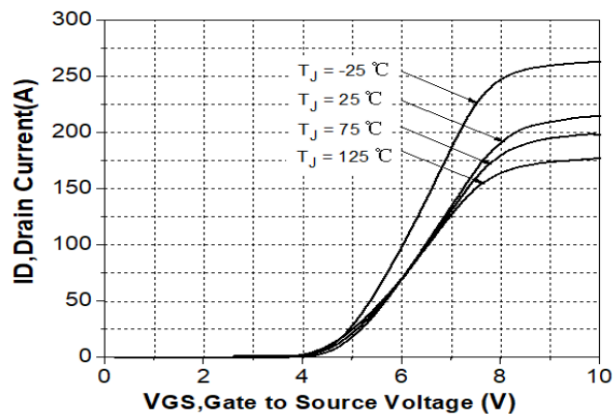
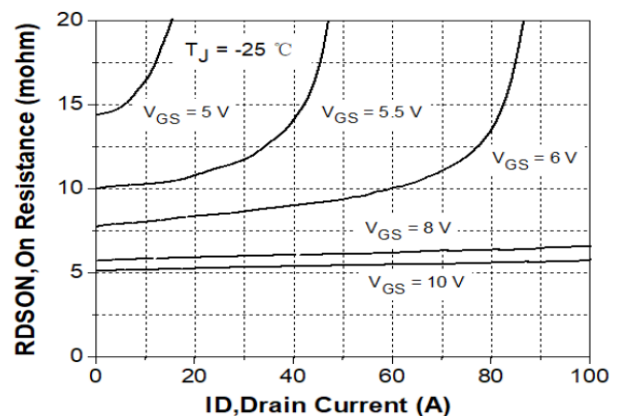


Fig. 6 State Resistance vs. Drain Current @-25°C



Typical Performance Characteristics

Fig.7 State Resistance vs. Drain Current @25°C

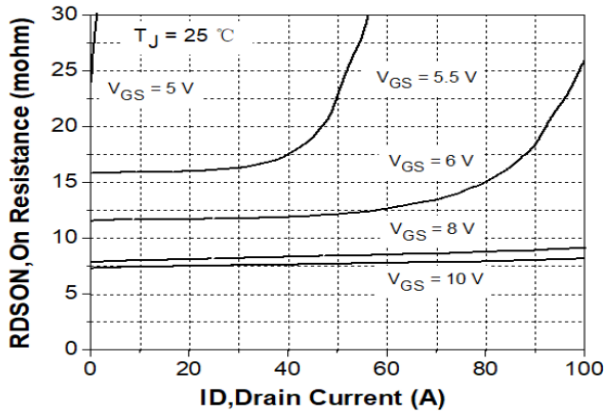


Fig. 8 State Resistance vs. Drain Current @125°C

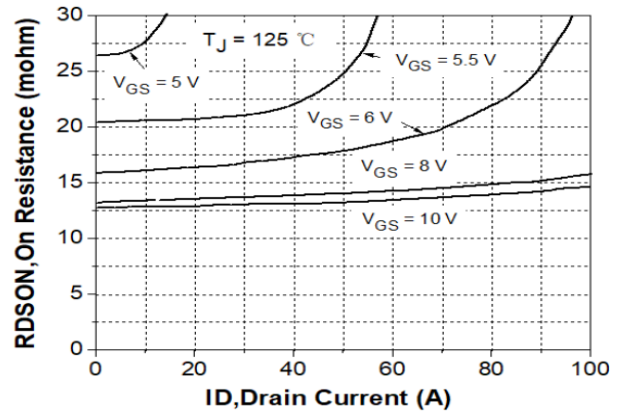


Fig.9 Typical Capacitance vs. Drain Source Voltage

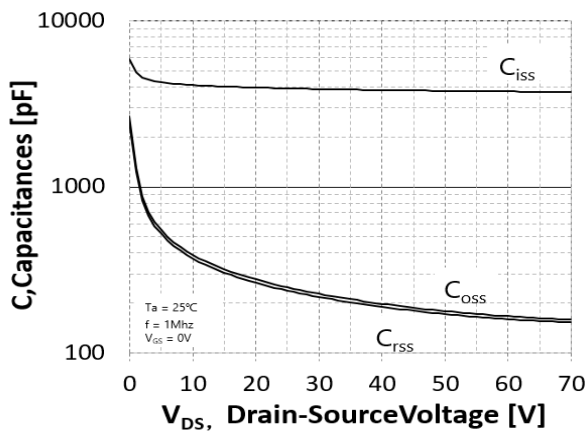


Fig.10 Dynamic Input Characteristics

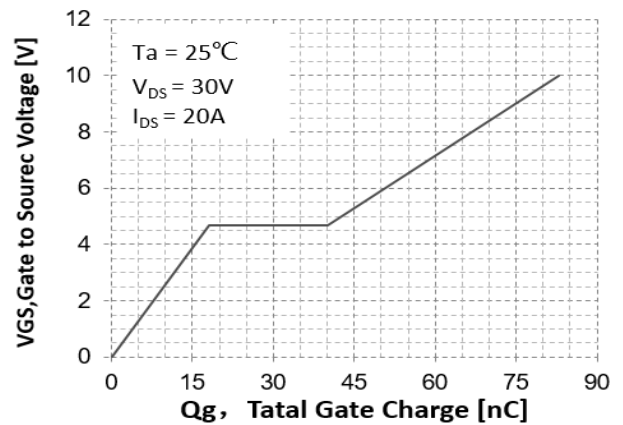


Fig.11 Breakdown Voltage vs. Junction Temperature

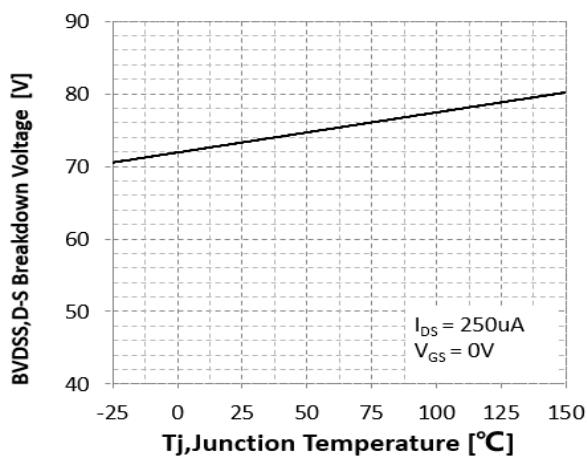
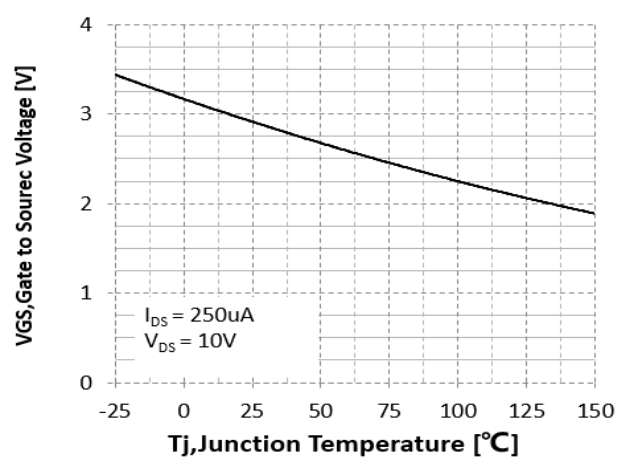


Fig. 12 Gate Threshold Voltage vs. Junction Temperature



Typical Performance Characteristics

Fig.13 On-Resistance Variation vs. Junction Temperature

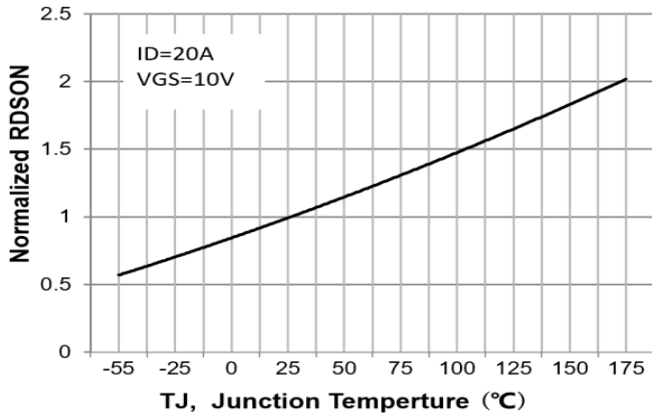


Fig.14 Maximum Drain Current vs. Case Temperature

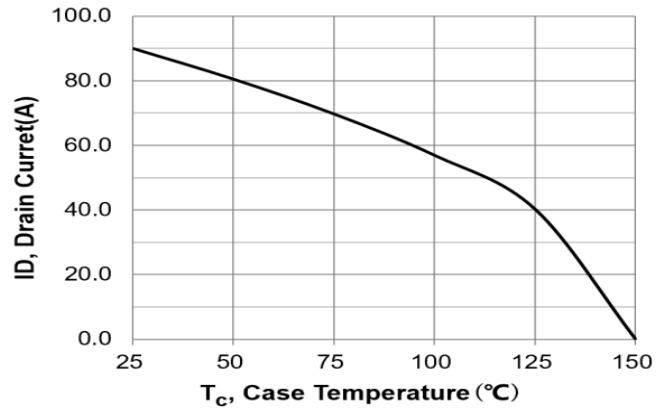


Fig.15 Body Diode Forward Voltage Vs Reverse Drain Current

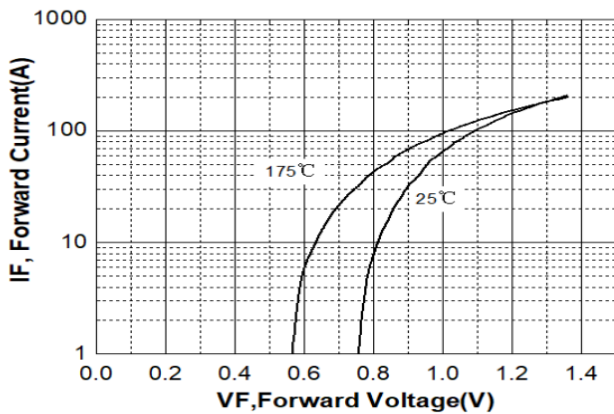


Fig.16 Safe Operating Area

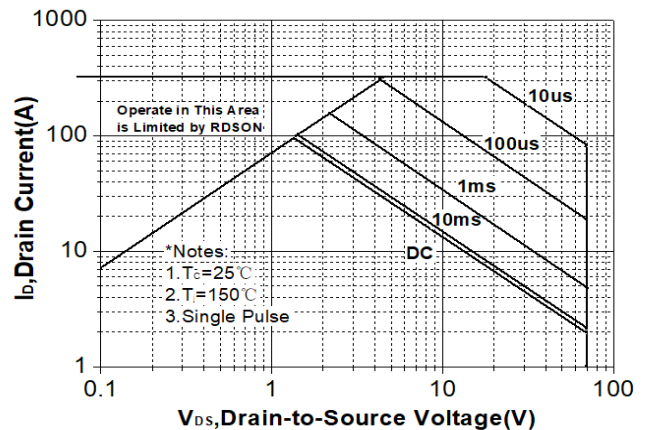
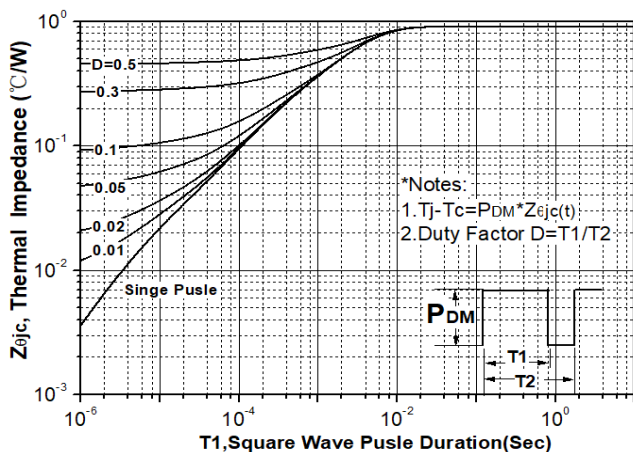
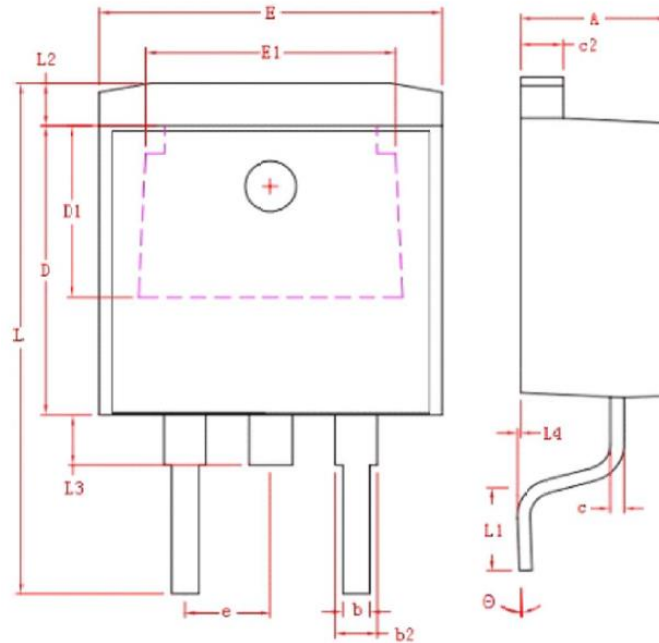


Fig. 17 Transient Thermal Response Curve



Package Dimensions

TO-263



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.40	4.80
b	0.76	1.00
L4	0.00	0.25
C	0.36	0.50
L3	1.50 REF	
L1	2.29	2.79
E	9.80	10.40
E1	7.40 REF	
c2	1.25	1.45
b2	1.17	1.47
D	8.60	9.00
D1	5.10 REF	
e	2.54 REF	
L	14.6	15.8
θ	0° ± 3°	
L2	1.27 REF	