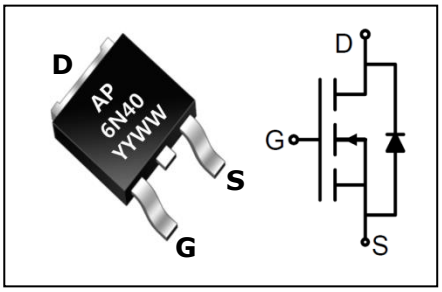
400V 6A Low Qg N-Ch Power MOSFET

FEATURES

- Low drain-source On resistance : $R_{DS(on)}$ = 0.9Ω (Typ.)
- Low gate charge : Qg = 14nC (Typ.)
- Low reverse transfer capacitance : C_{rss} = 9.5pF (Typ.)
- RoHS compliant device
- 100% avalanche tested



APPLICATIONS

- High speed switching
- LED power
- Motor power

Ordering Information

Part No	Package	Packing	Finish	Halogen	Packing Unit
AM6N40RD	TO-252	Reel & Tape	Sn	Free	2,500ea

Marking Information

Row 1 : AP

Row 2 : Product Information

Row 3 : Date Code

- YY : Year Code

- WW : Week Code

Maximum Ratings (T_C=25 ℃, unless otherwise noted)

Characteristic	Symbol		Rating	Unit
Drain-source voltage	V_{DS}		400	V
Gate-source voltage	V_{GS}		±30	V
Drain current (DC)*	I_D	T_C = 25℃	5.5	A
		T_C = 100℃	3.46	
Drain current (Pulsed)*	I_{DM}		22	A
Single avalanche energy (Note 2)	E_{AS}		380	mJ
Repetitive avalanche current (Note 1)	I_{AR}		5.5	A
Repetitive avalanche energy (Note 1)	E_{AR}		5.5	mJ
Power dissipation	P_D		55	W
Junction temperature	T_J		150	℃
Storage temperature range	T_{stg}		-55~150	℃

***Limited only maximum junction temperature**

REV. 00

Thermal Characteristic

Characteristic	Symbol	Rating	Unit
Thermal resistance, junction to case	$R_{th(j-c)}$	Max. 2.27	℃/W
Thermal resistance, junction to ambient	$R_{th(j-a)}$	Max. 62.5	

Electrical Characteristics (T_C=25 ℃, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage	BV_{DSS}	I_D = 250uA, V_{GS}= 0	400	-	-	V
Gate threshold voltage	$V_{GS(th)}$	I_D = 250uA, V_{DS} = V_{GS}	2	-	4	V
Drain-source cut-off current	I_{DSS}	V_{DS} = 400V, V_{GS} = 0V	-	-	1	uA
		V_{DS} = 400V, T_C = 150℃	-	-	100	uA
Gate leakage current	I_{GSS}	V_{DS} = 0V, V_{GS} = ±30V	-	-	±100	nA
Drain-source on-resistance	$R_{DS(ON)}$	V_{GS} = 10V, I_D = 2.75A	-	0.9	1.05	Ω
Forward transfer conductance (Note 3)	g_{fs}	V_{DS} = 10V, I_D = 2.75A	-	4.4	-	S
Input capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	802	-	pF
Output capacitance	C_{oss}		-	65	-	
Reverse transfer capacitance	C_{rss}		-	9.5	-	
Turn-on delay time (Note 3,4)	$T_{d(on)}$	V_{DS} = 220V, I_D = 5.5A, RG = 25Ω	-	58	-	ns
Rise time (Note 3,4)	T_r		-	38	-	
Turn-off delay time (Note 3,4)	$t_{d(off)}$		-	95	-	
Fall time (Note 3,4)	t_f		-	30	-	
Total gate charge (Note 3,4)	Q_g	V_{DS} = 320V,V_{GS} = 10V I_D = 5.5A	-	14	20	nC
Gate-source charge (Note 3,4)	Q_{gs}		-	4.7	-	
Gate-drain charge (Note 3,4)	Q_g		-	2.3	-	

Source-Drain Diode Ratings and Characteristics (T_C=25 ℃, unless otherwise noted)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Source current (DC)	I_S	Integral reverse diode in the MOSFET	-	-	5.5	A
Source current (Pulsed)	I_{SM}		-	-	22	A
Forward voltage	V_{SD}	VGS = 0V, ISD = 5.5A	-	-	1.4	V
Reverse recovery time (Note 3,4)	t_{rr}	ISD = 5.5A, VGS = 0V dIF/dt = 100A/us	-	270	-	ns
Reverse recovery charge (Note 3,4)	Q_{rr}		-	1.9	-	uC

Note :

1. Repeated rating : Pulse width limited by safe operating area.
2. L = 22mH, I_{AS} = 5.5A, V_{DD} = 50V, R_G = 25Ω Starting T_J = 25℃
3. Pulse test : Pulse width ≤ 300us, Duty cycle ≤ 2%
4. Essentially independent of operating temperature typical characteristics.

Typical Electrical Characteristic

Fig. 1 Typical Output Characteristics

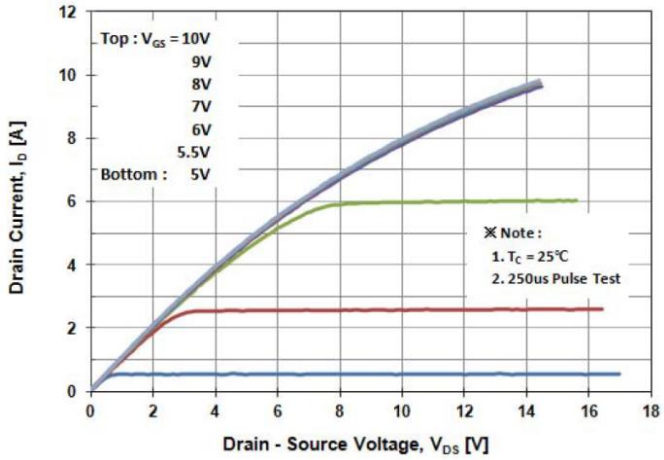


Fig. 2 Typical Transfer Characteristics

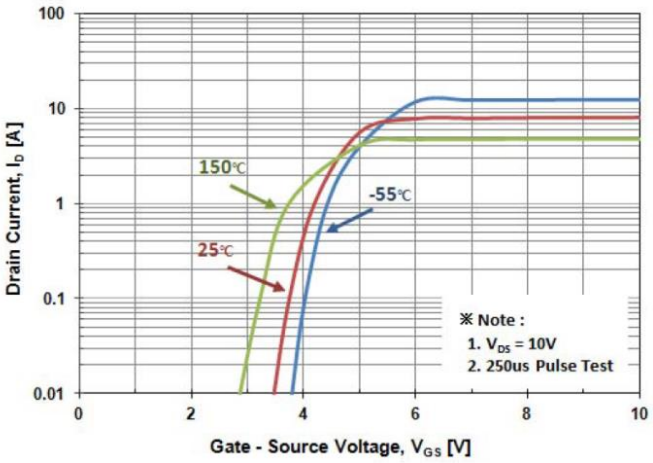


Fig.3 On-Resistance Variation with Drain Current and Gate Voltage

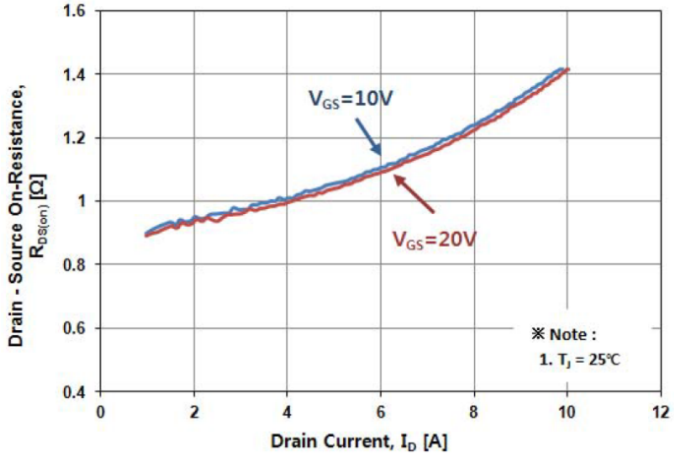


Fig. 4 Body Diode Forward Voltage Variation with Source Current

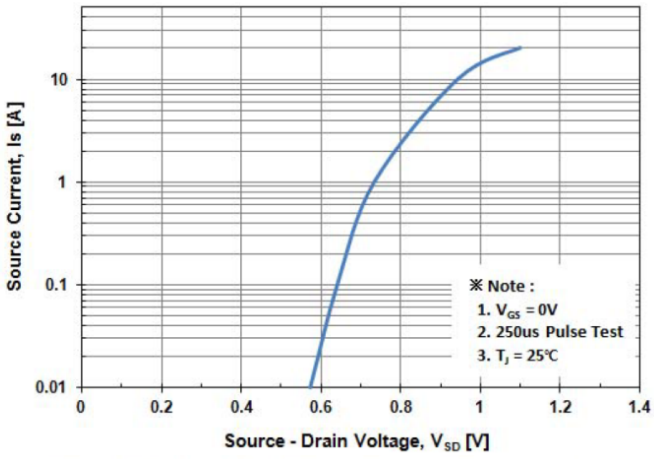


Fig. 5 Typical Capacitance Characteristics

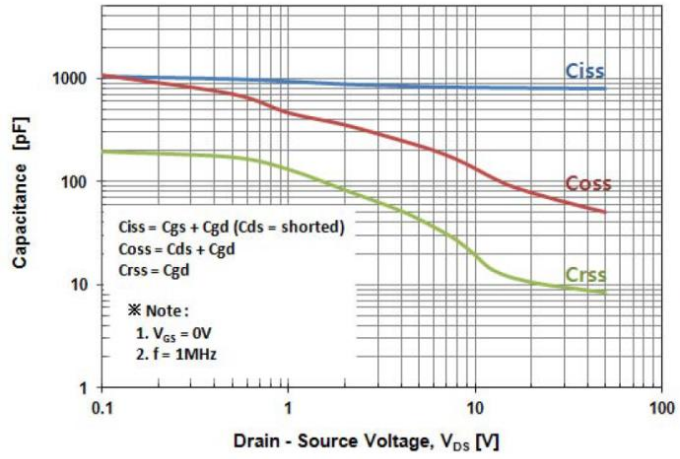


Fig. 6 Typical Total Gate Charge Characteristics

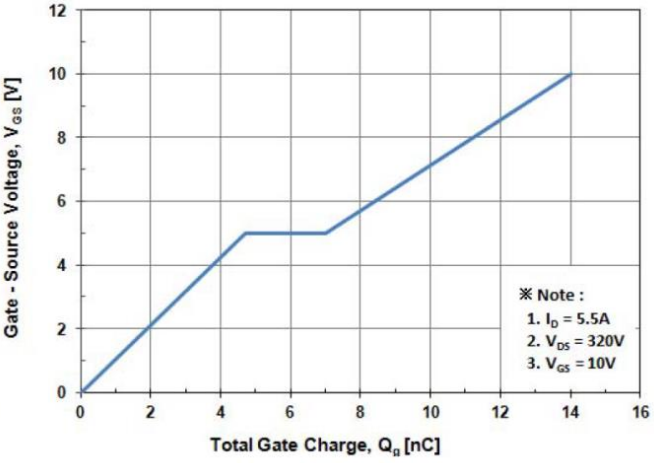


Fig. 7 Breakdown Voltage Variation vs. Temperature

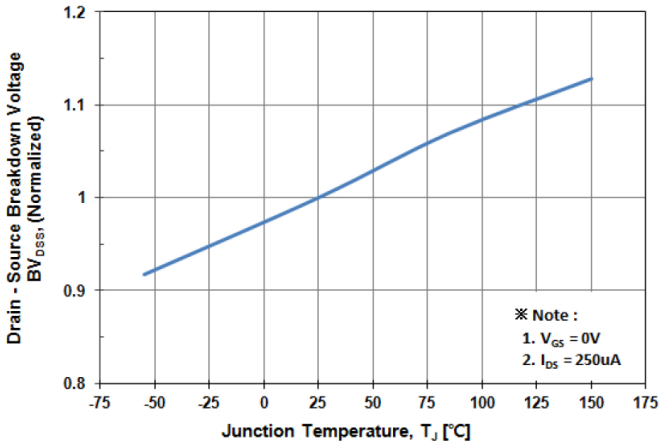


Fig. 8 On-Resistance Variation vs. Temperature

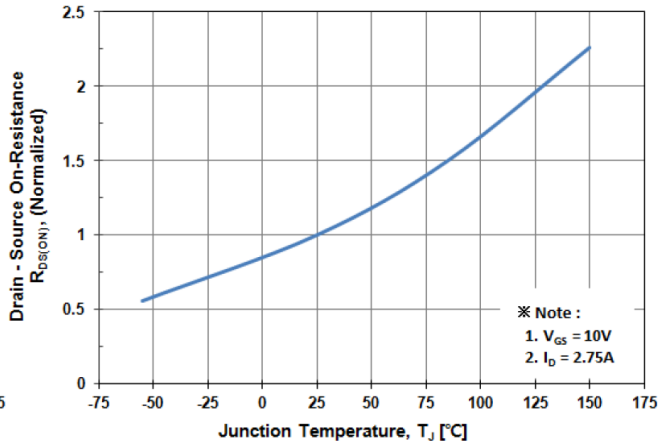


Fig. 9 Maximum Drain Current vs. Case Temperature

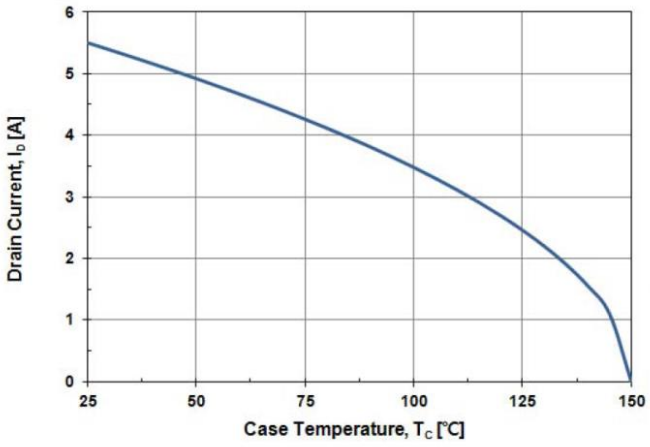


Fig. 10 Maximum Safe Operating Area

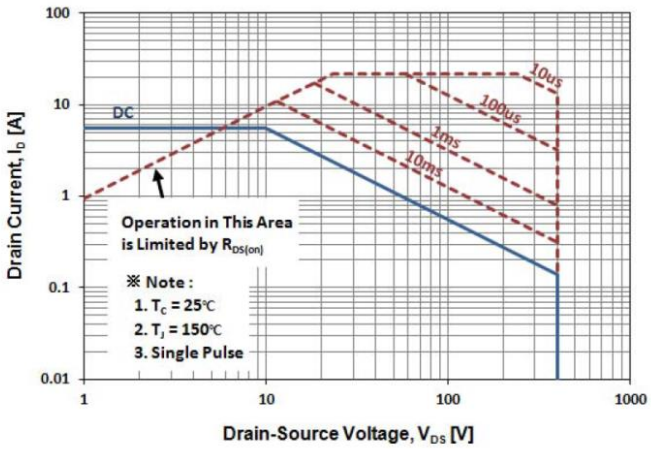


Fig. 11 Transient Thermal Impedance

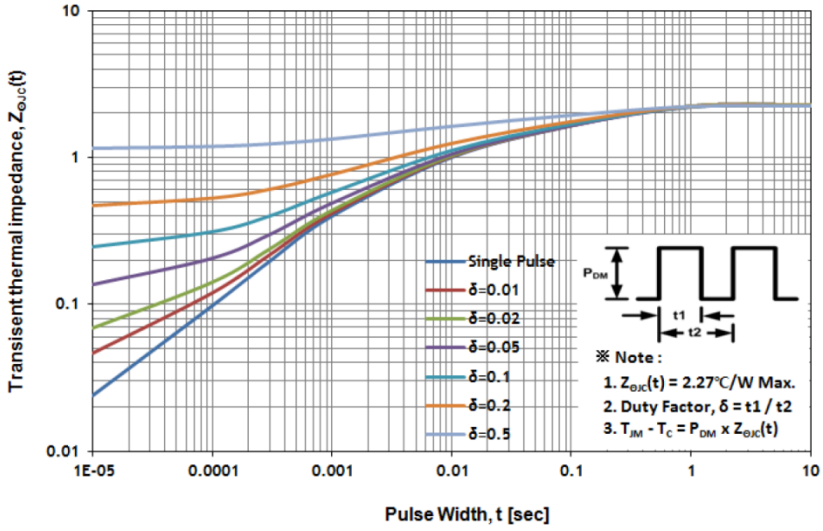


Fig. 12 Gate Charge Test Circuit & Waveform

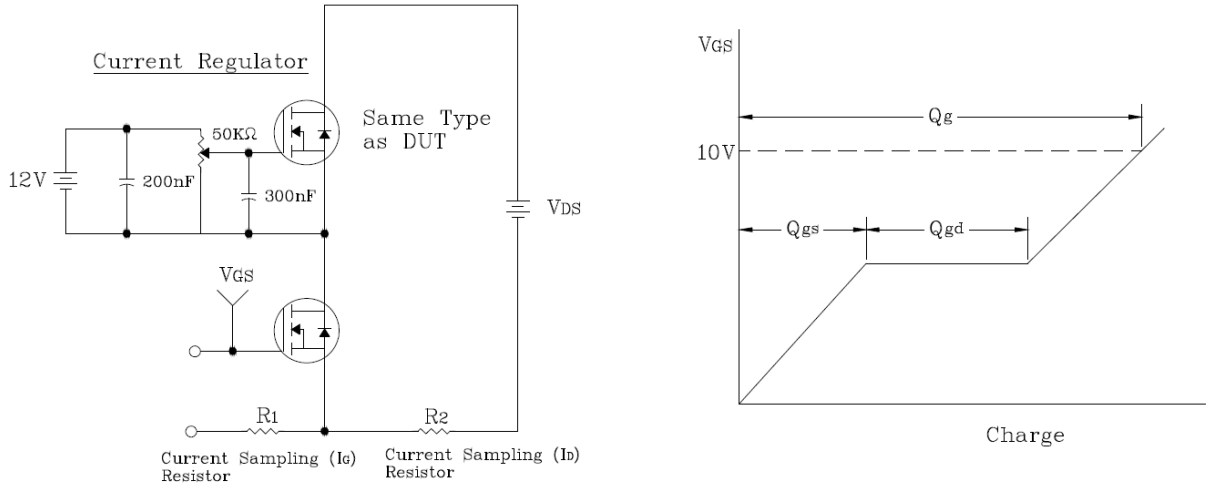


Fig. 13 Resistive Switching Test Circuit & Waveform

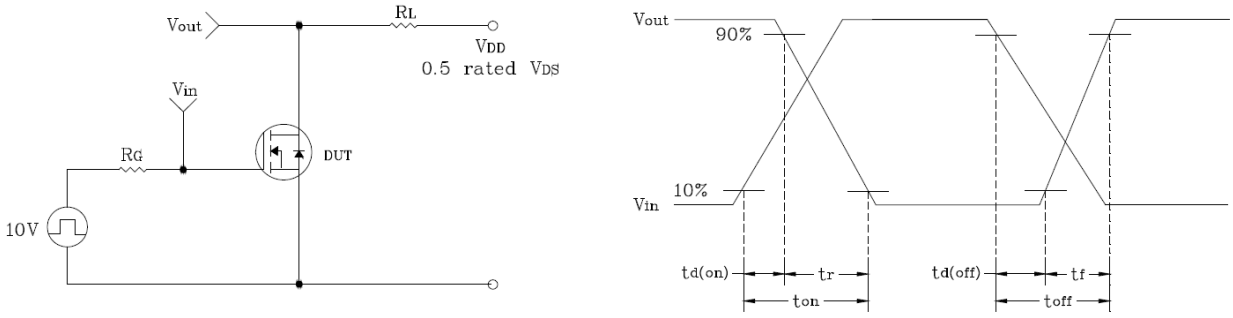


Fig. 14 E_{AS} Test Circuit & Waveform

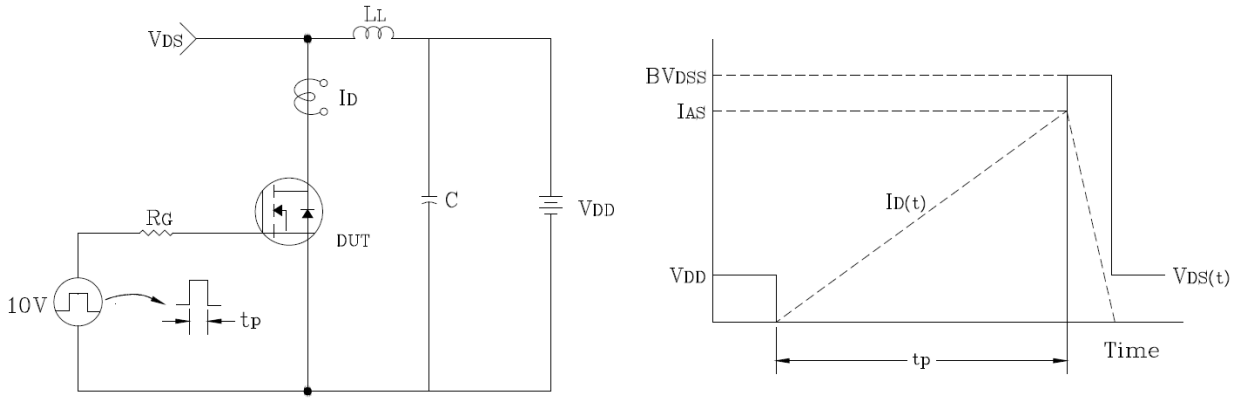
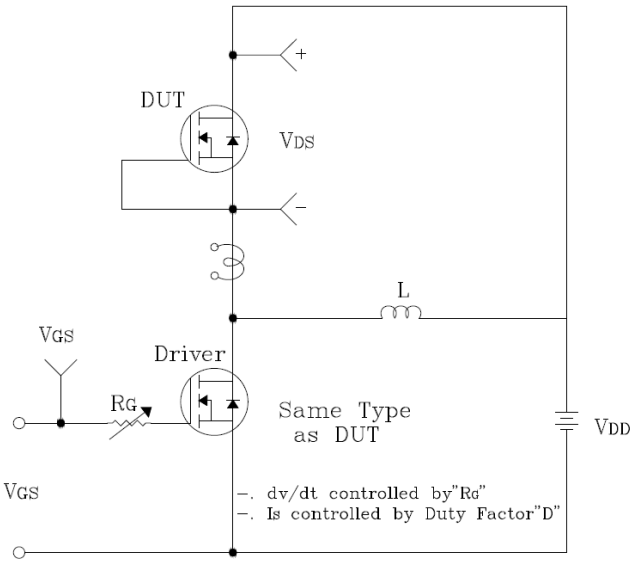
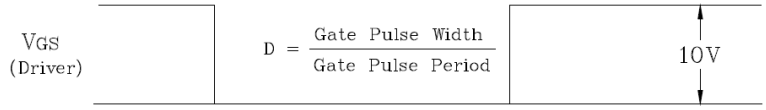
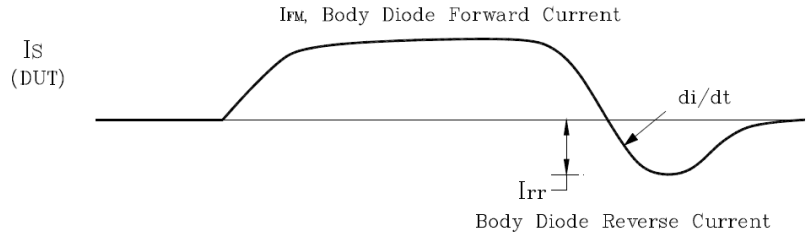
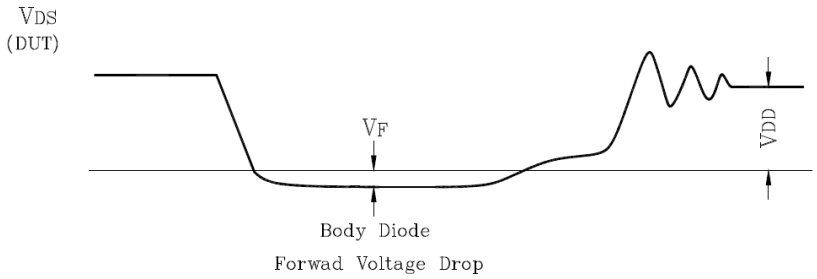


Fig. 15 Diode Reverse Recovery Time Test Circuit & Waveform



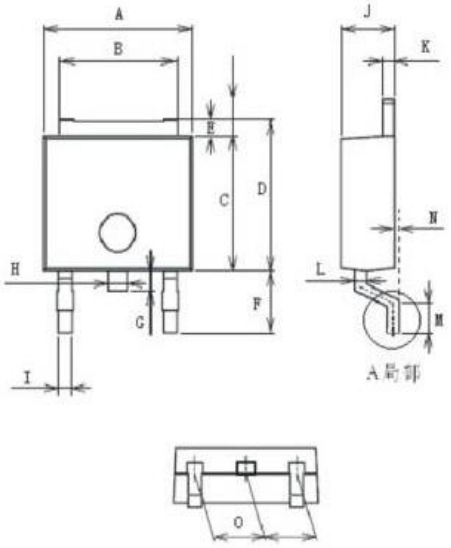






Package Dimensions

TO-252



Unit: mm

Item	Min	Max
A	6.40	6.70
B	5.20	5.40
C	6.00	6.30
D	6.55	6.85
E	0.45	0.60
F	3.07	3.35
G	0.85	1.05
H	0.75	0.95
I	0.55	0.75
J	2.20	2.40
K	0.43	0.58
L	0.43	0.58
M	0.90	1.10
N	0.90	1.10
O	2.20	2.40

Revision History

No	Date	Contents
0	2016-03-31	Initial Brief Datasheet Release

http://www.apsemi.com

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