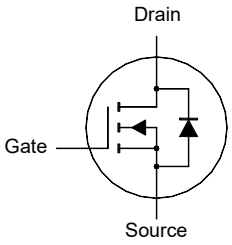
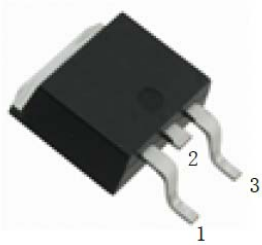
WPR60N880-HAF

N-Channel Enhancement Mode MOSFET

Features

- Low Gate Charge
- Halogen and Antimony Free(HAF), RoHS compliant





1.Gate 2.Drain 3.Source

TO-252 Plastic Package

Application

- Hard / soft switching topology

Key Parameters

Parameter	Value	Unit
BV_{DSS}	600	V
$R_{DS(ON)}$ Max	880 @ V_{GS} = 10 V	mΩ
$V_{GS(th)}$ typ	2.7	V
Q_g typ	10.6 @ V_{GS} = 10 V	nC

Absolute Maximum Ratings(at T_a = 25℃ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	600	V
Gate-Source Voltage		V_{GS}	± 30	V
Drain Current	T_c = 25℃ T_c = 100℃	I_D	5 3.2	A
Peak Drain Current, Pulsed [1]		I_{DM}	12	A
Single Pulse Avalanche Current		I_{AS}	2.1	A
Single Pulse Avalanche Energy [2]		E_{AS}	174	mJ
Power Dissipation	T_c = 25℃	P_D	45	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to + 150	℃

Thermal Characteristics

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Case	$R_{\theta JC}$	2.8	℃/W
Thermal Resistance from Junction to Ambient [3]	$R_{\theta JA}$	50	℃/W

[1] Pulse width tp limited by $T_{J(MAX)}$.

[2] Limited by $T_{J(MAX)}$, starting T_J = 25 °C, L = 79 mH, R_g = 25 Ω, I_D = 2.1 A, V_{GS} = 10 V.

[3] Device Surface Mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate, in a still air.

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Dated: 18/08/2020 Rev: 01

Characteristics at T_a = 25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = 250 μA	BV_{DSS}	600	-	-	V
Drain-Source Leakage Current at V_{DS} = 600 V	I_{DSS}	-	-	1	μA
Gate Leakage Current at V_{GS} = ± 30 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{GS}, I_D = 250 μA	$V_{GS(th)}$	2	-	4	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 2.5 A	$R_{DS(on)}$	-	0.7	0.88	Ω
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = 5 V, I_D = 2.5 A	g_{fs}	-	3	-	S
Gate Resistance at V_{GS} = 0 V, V_{DS} = 0 V, f = 1MHz	R_g	-	3.5	-	Ω
Input Capacitance at V_{GS} = 0 V, V_{DS} = 100 V, f = 1 MHz	C_{iss}	-	307	-	pF
Output Capacitance at V_{GS} = 0 V, V_{DS} = 100 V, f = 1 MHz	C_{oss}	-	26	-	pF
Reverse Transfer Capacitance at V_{GS} = 0 V, V_{DS} = 100 V, f = 1 MHz	C_{rss}	-	6	-	pF
Gate charge total at V_{DS} = 300 V, I_D = 2.5 A, V_{GS} = 10 V	Q_g	-	10.6	-	nC
Gate to Source Charge at V_{DS} = 300 V, I_D = 2.5 A, V_{GS} = 10 V	Q_{gs}	-	2.2	-	nC
Gate to Drain Charge at V_{DS} = 300 V, I_D = 2.5 A, V_{GS} = 10 V	Q_{gd}	-	4.8	-	nC
Turn-On Delay Time at V_{DS} = 300 V, V_{GS} = 10 V, I_D = 2.5 A, R_g = 24 Ω	$t_{d(on)}$	-	15.8	-	nS
Turn-On Rise Time at V_{DS} = 300 V, V_{GS} = 10 V, I_D = 2.5 A, R_g = 24 Ω	t_r	-	14.5	-	nS
Turn-Off Delay Time at V_{DS} = 300 V, V_{GS} = 10 V, I_D = 2.5 A, R_g = 24 Ω	$t_{d(off)}$	-	16.8	-	nS
Turn-Off Fall Time at V_{DS} = 300 V, V_{GS} = 10 V, I_D = 2.5 A, R_g = 24 Ω	t_f	-	62.7	-	nS
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at I_S = 2.5 A, V_{GS} = 0 V	V_{SD}	-	-	1.2	V
Body Diode Reverse Recovery Time at I_S = 2.5 A, di/dt = 100 A / μs	t_{rr}	-	200	-	nS
Body Diode Reverse Recovery Charge at I_S = 2.5 A, di/dt = 100 A / μs	Q_{rr}	-	1.3	-	uC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristic

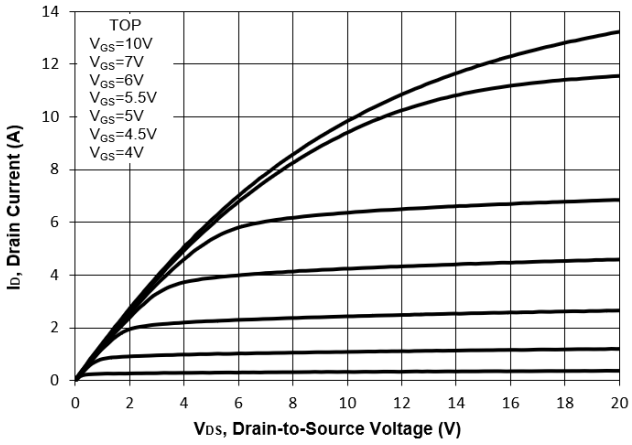


Fig. 2 Typical Transfer Characteristic

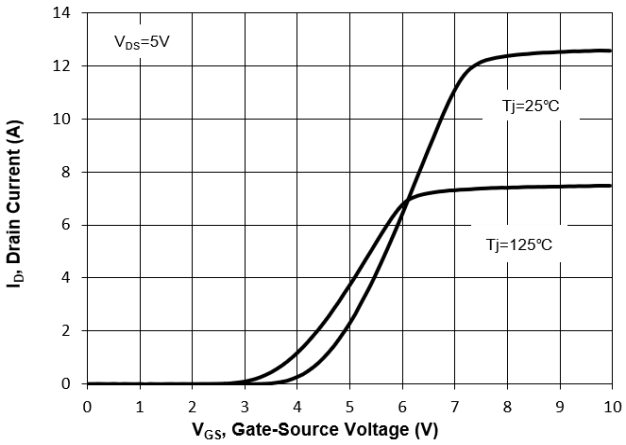


Fig. 3 on-Resistance vs. Drain Current

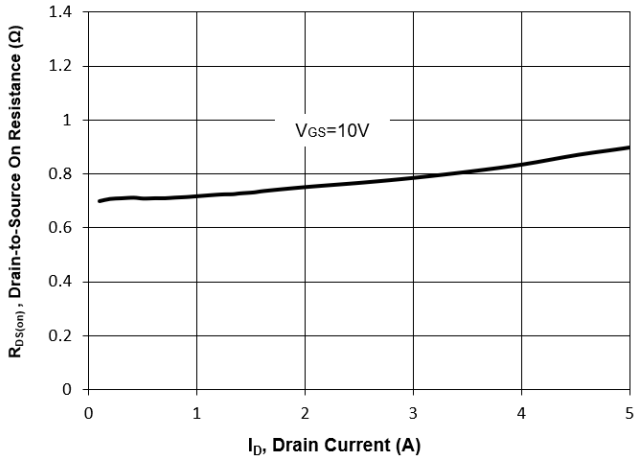


Fig. 4 on-Resistance vs. Gate Voltage

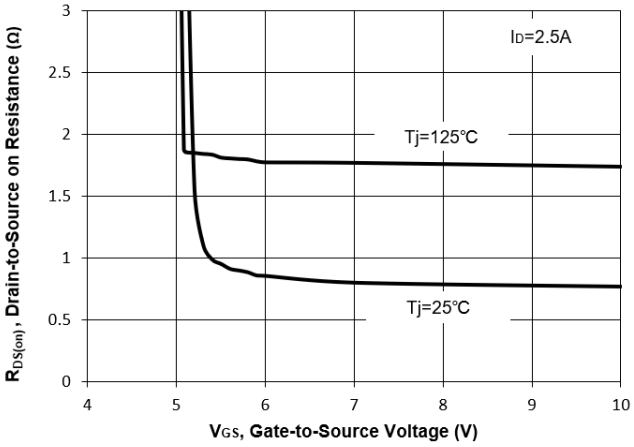


Fig. 5 on-Resistance vs.T_j

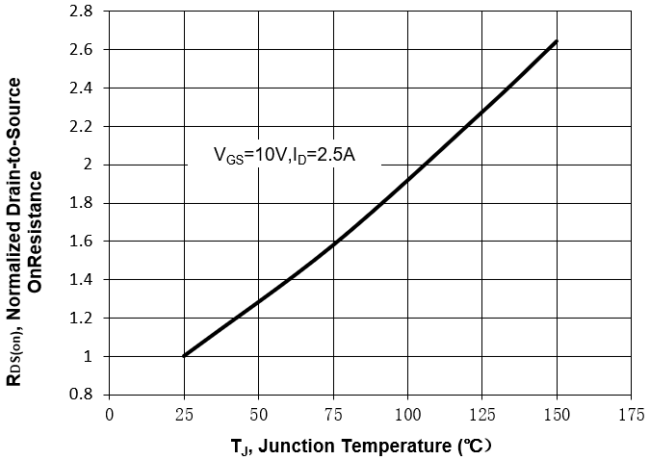
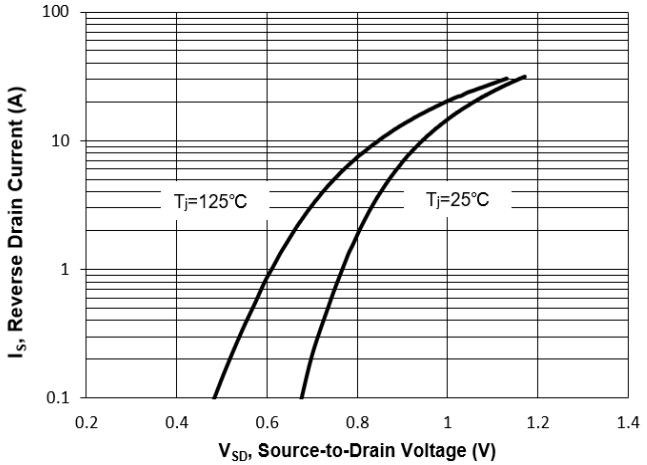


Fig. 6 Typical Forward Characteristic



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Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

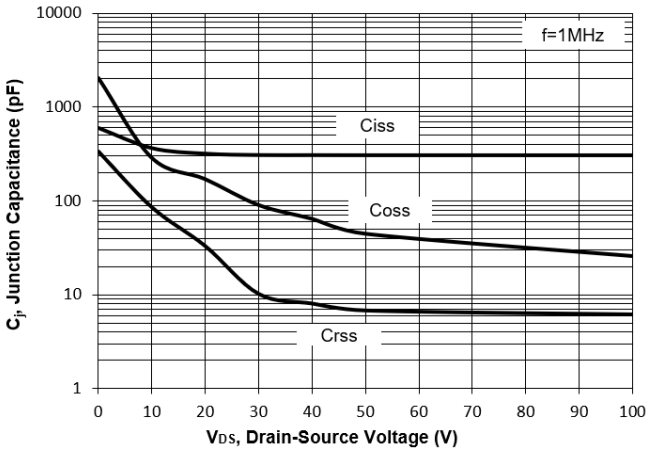


Fig. 8 Drain-Source Leakage Current vs. T_j

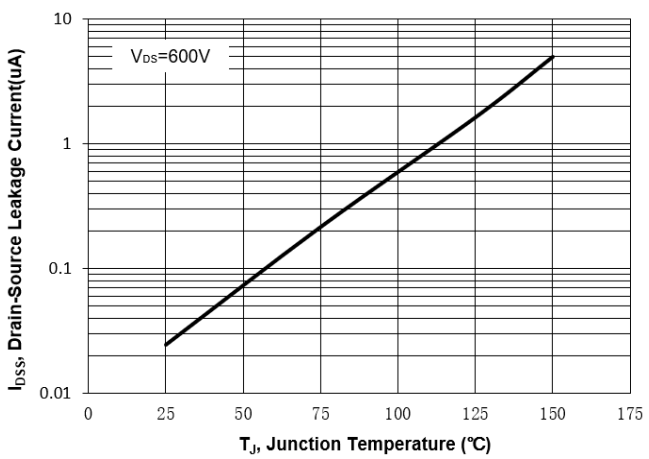


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

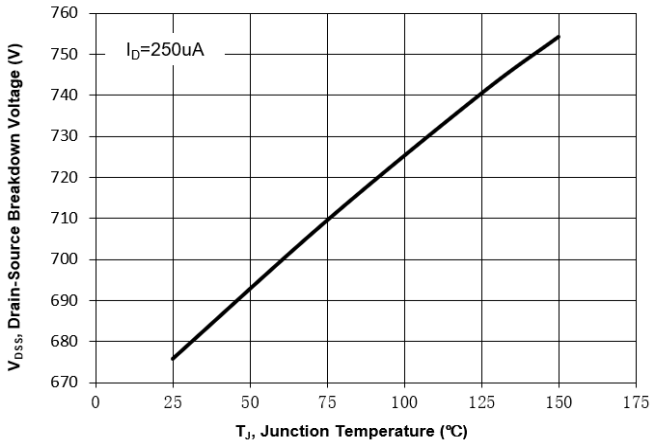


Fig. 10 Gate Threshold Variation vs. T_j

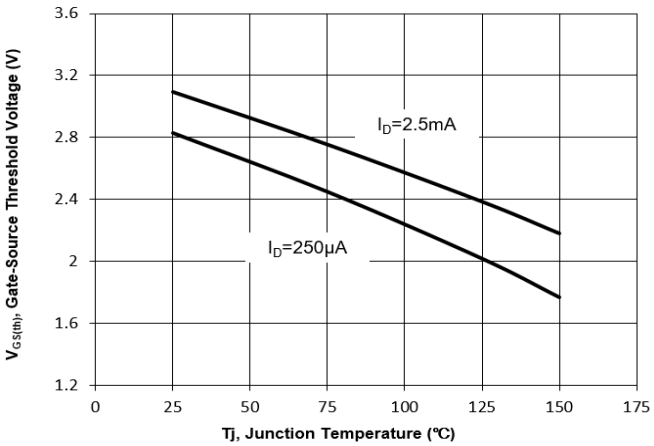


Fig. 11 Gate Charge

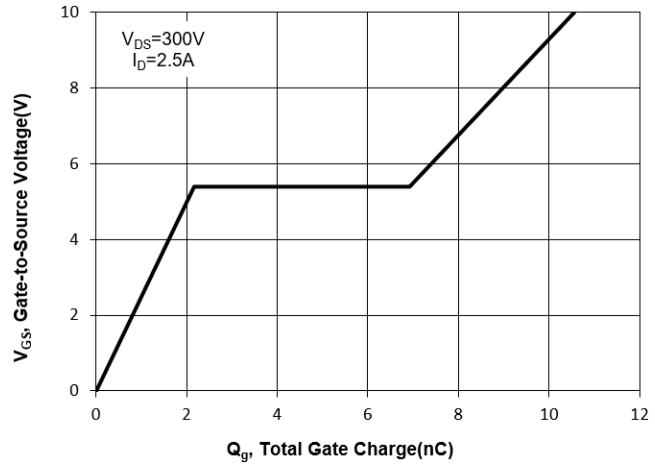
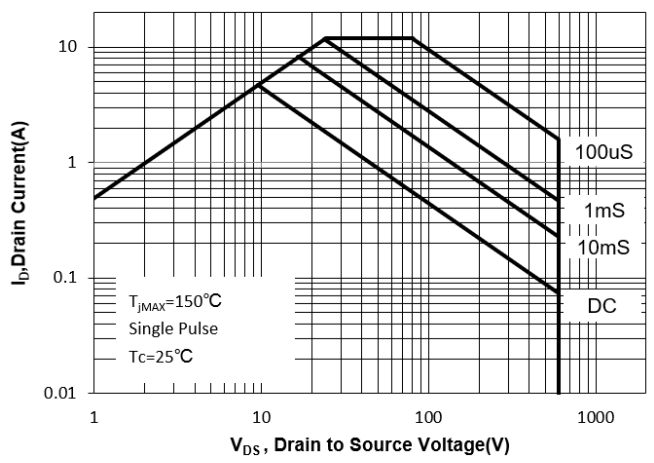


Fig. 12 Safe Operation Area



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Electrical Characteristics Curves

Fig.13 Normalized Maximum Transient Thermal Impedance($z_{\Theta JC}$)

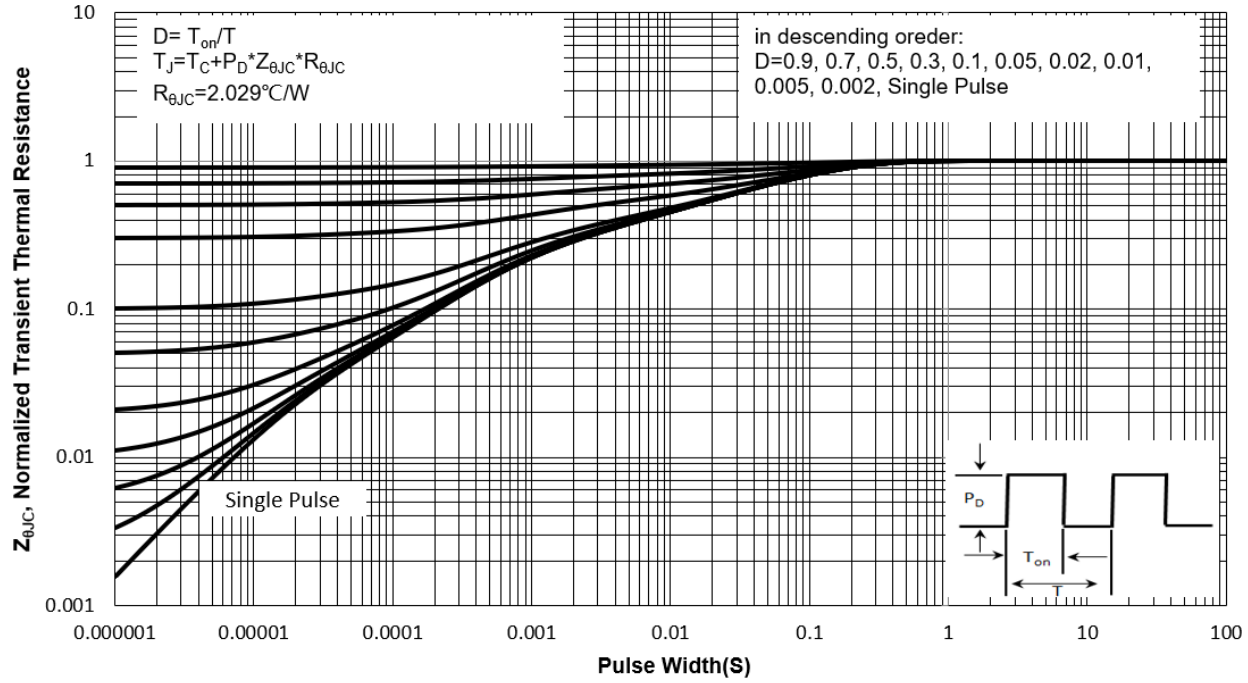
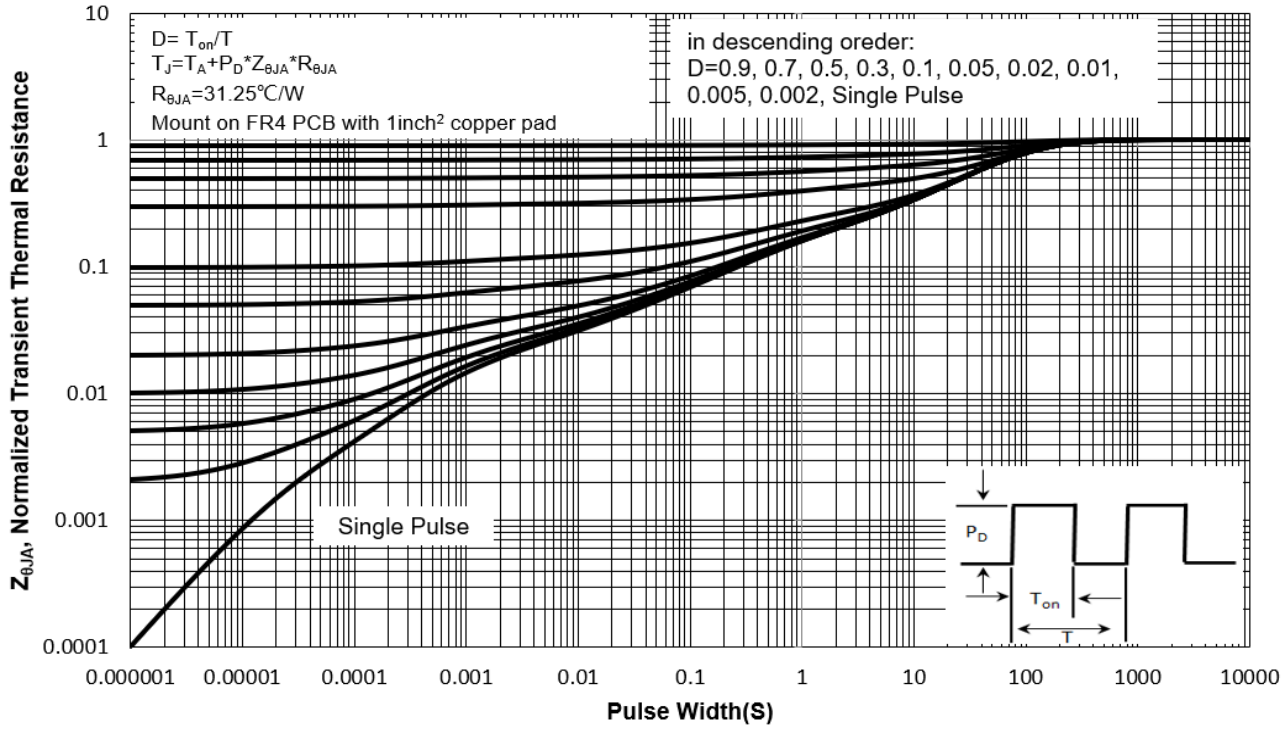


Fig.14 Normalized Maximum Transient Thermal Impedance($z_{\Theta JA}$)



Test Circuits

Fig.1-1 Switching times test circuit

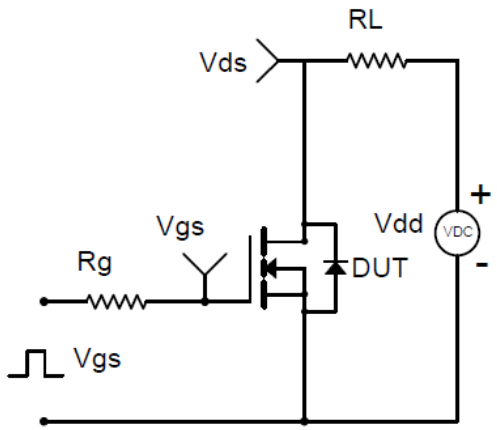


Fig.1-2 Switching Waveform

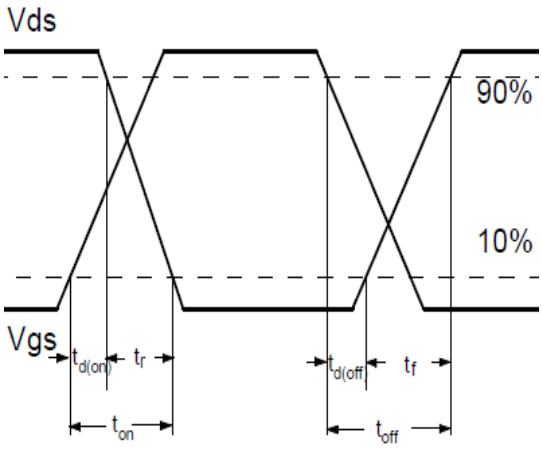


Fig.2-1 Gate charge test circuit

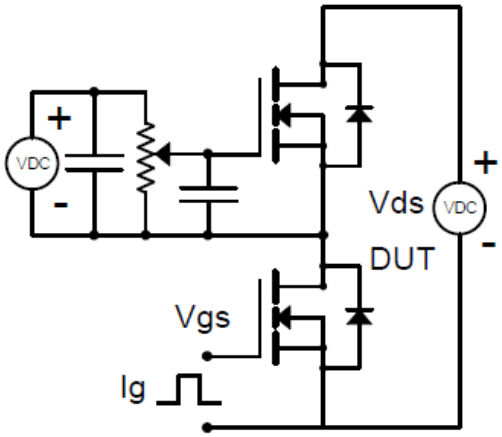


Fig.2-2 Gate charge waveform

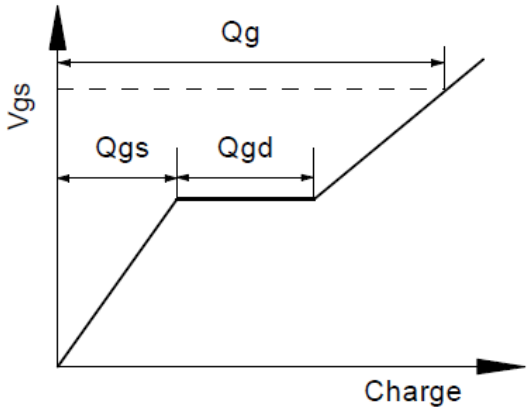


Fig.3-1 Avalanche test circuit

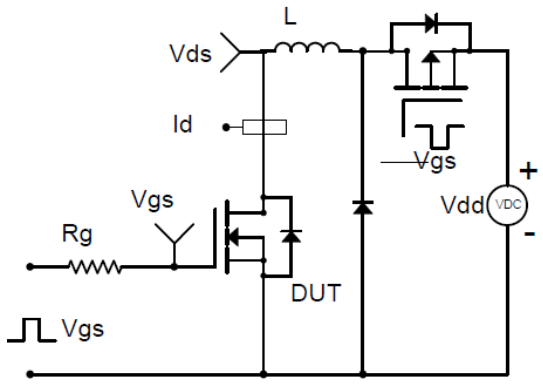
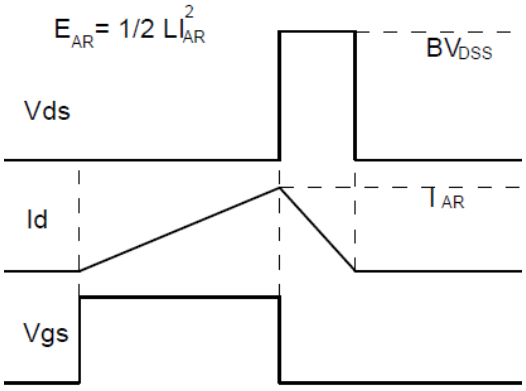
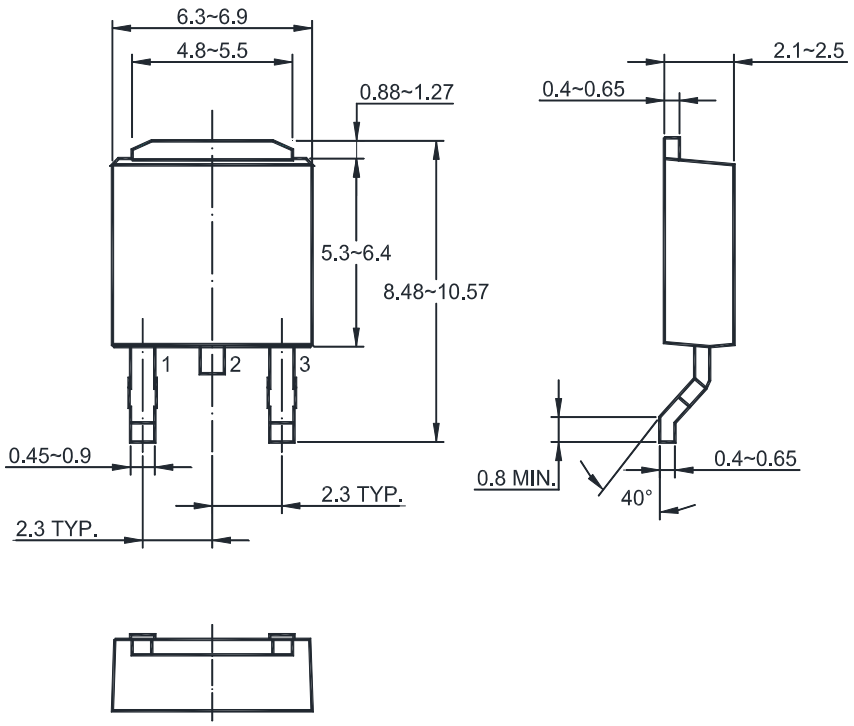


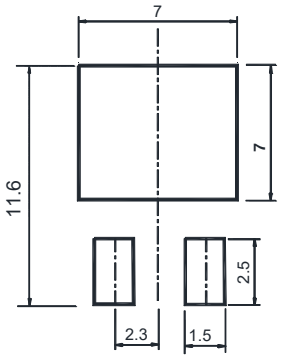
Fig.3-2 Avalanche waveform



Package Outline (Dimensions in mm) TO-252



Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
TO-252	12	8 ± 0.1	0.315 ± 0.004	330	13	2,500

Marking information

" PR60N880 " = Part No.

" ****** " = Date Code Marking

Font type: Arial

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