N-Channel, 600V, 7A, POWER MOSFET

Features

- ✧ New technology for high voltage device
- ✧ Low on-resistance and low conduction losses
- ✧ Small package : TO-252
- ✧ Ultra Low Gate Charge cause lower driving requirements
- ✧ 100% Avalanche Tested

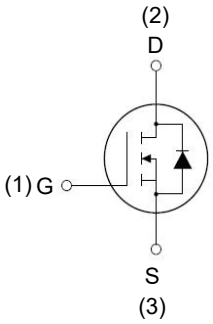
V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
600	1.06 @ V_{GS}=10V

Applications

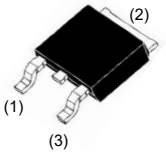
- ✧ LED power supplies
- ✧ Cell Phone Charger
- ✧ Standby Power

Mechanical Data

- ✧ Case : Molded plastic body
- ✧ Terminals : Solder plated, solderable per MIL-STD-750,Method 2026
- ✧ Polarity : As marked
- ✧ RoHS/WEEE Compliant



Circuit Diagram



TO-252

Absolute Maximum Rating at T_A = 25 °C, unless otherwise specified

Parameter		Symbol	Value	Units
Drain-Source Voltage (VGS=0V)		V_{DS}	600	V
Gate-Source Voltage (VDS=0V) AC (f>1 Hz)		V_{GS}	±30	V
Continuous Drain Current	T_C=25℃	$I_{D\ (DC)}$	7	A
Power Dissipation	T_C=25℃	P_D	147	W
Thermal Resistance，Junction-to-Case（Maximum）		$R_{\theta JC}$	0.85	℃/W
Thermal Resistance，Junction-to-Ambient （Maximum）		$R_{\theta JA}$	62.5	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

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Electrical Characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Tests conditions	Min	Typ	Max	Units
Off –Characteristics						
Drain-Source Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	600	-	-	V
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	I_D=250μA, referenced to 25℃	-	0.65	-	V/℃
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=600V,V_{GS}=0V, T_C=25℃	-	-	1	μA
Gate-body leakage current, forward	I_{GSSF}	V_{DS}=0V, V_{GS} =30V	-	-	80	nA
Gate-body leakage current, reverse	I_{GSSR}	V_{DS}=0V, V_{GS} =-30V	-	-	-80	nA
On-Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS} , I_D=250μA	2.0	-	4.0	V
Static Drain-Source On-Resistance[6]	$R_{DS(ON)}$	V_{GS} =10V , I_D=3.5A	-	1.06	1.27	Ω
Forward Transconductance	g_{fs}	V_{DS} = 40V, I_D=3.5A（note 4）	-	8.2	-	S
Dynamic Characteristics						
Input capacitance	C_{iss}	V_{DS}=25V, V_{GS} =0V, f=1.0MHz	-	1380	1800	pF
Output capacitance	C_{oss}		-	115	150	pF
Reverse transfer capacitance	C_{rss}		-	23	30	pF

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Electrical Characteristics at T_A = 25 °C, unless otherwise specified

Switching Characteristics						
Turn-On delay time	$t_d(on)$	V_{DD}=300V,I_D=7A,R_G=25Ω （note 4，5）	-	30	70	ns
Turn-On rise time	t_r		-	80	170	ns
Turn-Off delay time	$t_d(off)$		-	125	260	ns
Turn-Off Fall time	t_f		-	85	180	ns
Total Gate Charge	Q_g	V_{DS} =480V , I_D=7A V_{GS} =10V （note 4，5）	-	54	65	nC
Gate-Source charge	Q_{gs}		-	6.8	-	nC
Gate-Drain charge	Q_{gd}		-	23	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
Maximum Continuous Drain -Source Diode Forward Current	I_S		-	-	7.0	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}		-	-	28	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=7.0A	-	-	1.4	V
Reverse recovery time	t_{rr}	V_{GS}=0V, I_S=7.0A dI_F/dt=100A/μs (note 4)	-	415	-	ns
Reverse recovery charge	Q_{rr}		-	4.6	-	μC

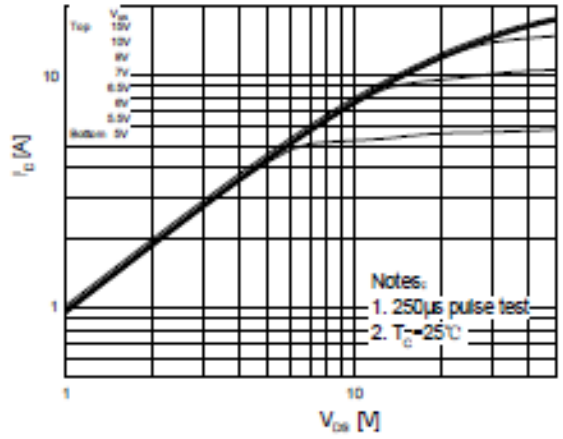
Notes:

1. Pulse width limited by maximum junction temperature
2. L=15.7mH, I_{AS}=7.0A, V_{DD}=50V, R_G=25Ω, Starting T_J=25℃
3. I_{SD}≤7.0A, di/dt≤300A/us, VDD≤BV_{DSS}, Starting T_J=25℃
4. Pulse Test: Pulse Width ≤300us, Duty Cycle≤2%
5. Essentially independent of operating temperature
6. $R_{DS(on)}$ CP test result, typical, is 1.06Ω @V_{GS}=10V, I_D=1.0A

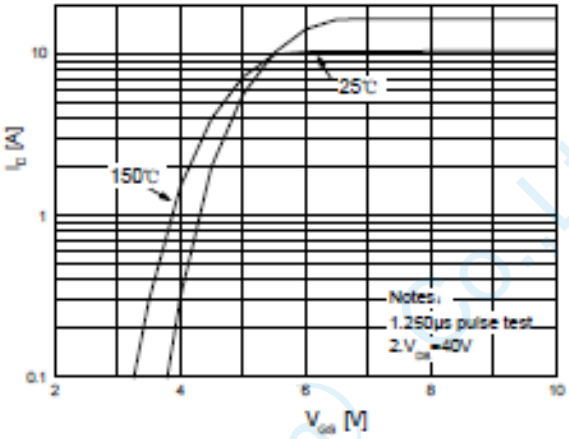
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Typical Characteristics at T_A = 25 °C, unless otherwise specified

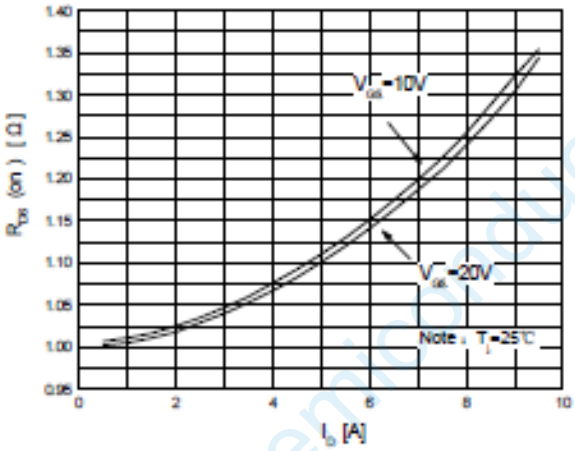
On-Region Characteristics



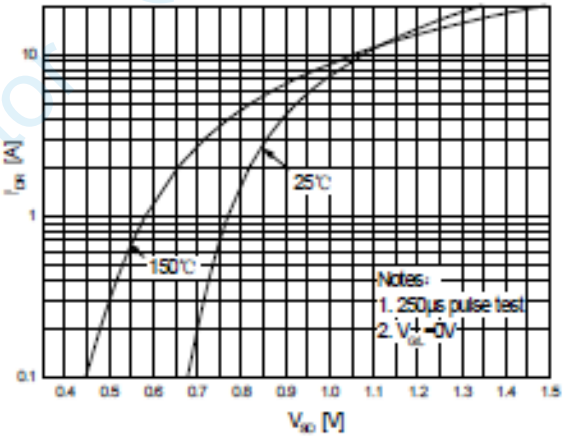
Transfer Characteristics



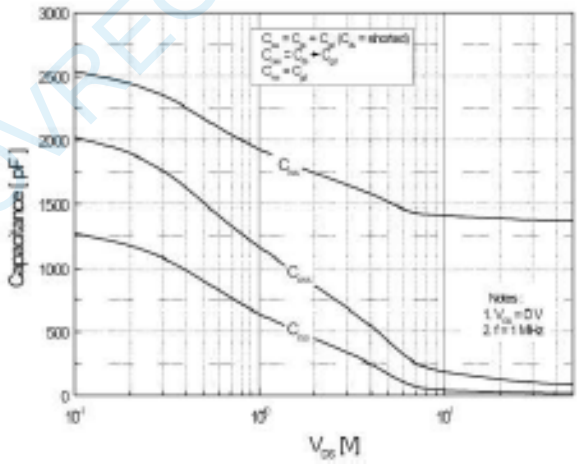
On-Resistance Variation vs. Drain Current and Gate Voltage



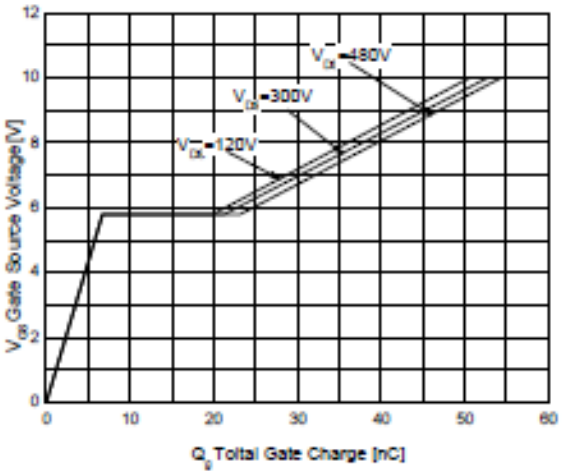
Body Diode Forward Voltage Variation vs. Source Current and Temperature



Capacitance Characteristics

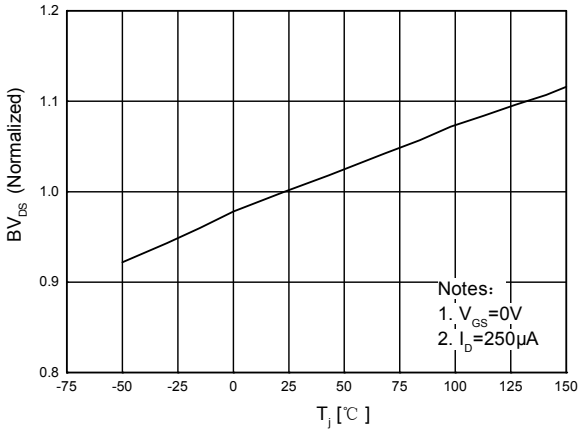


Gate Charge Characteristics

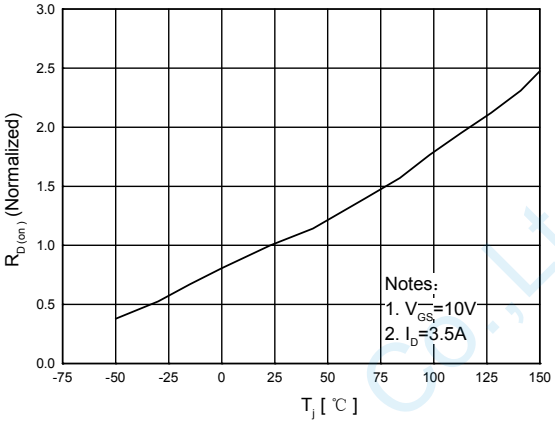


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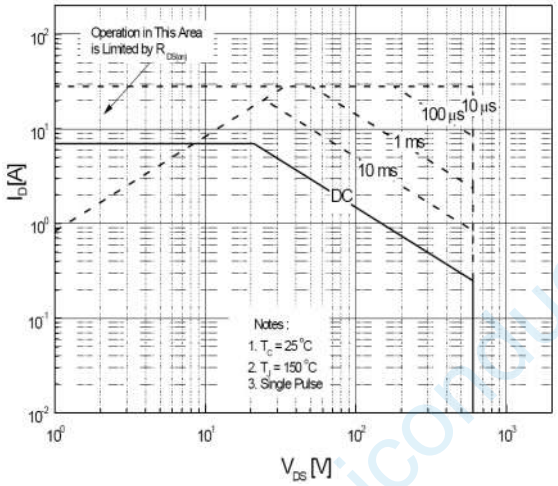
Breakdown Voltage Variation vs. Temperature



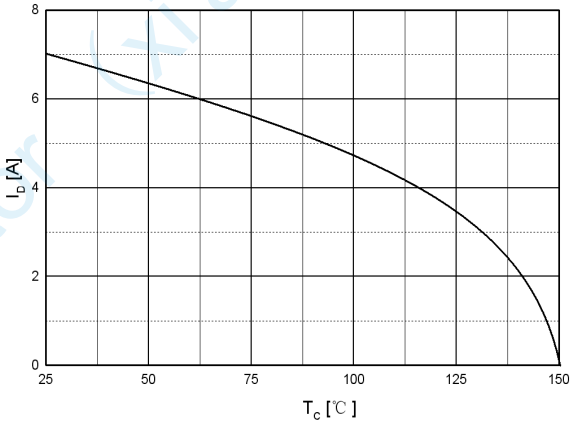
On-Resistance Variation vs. Temperature



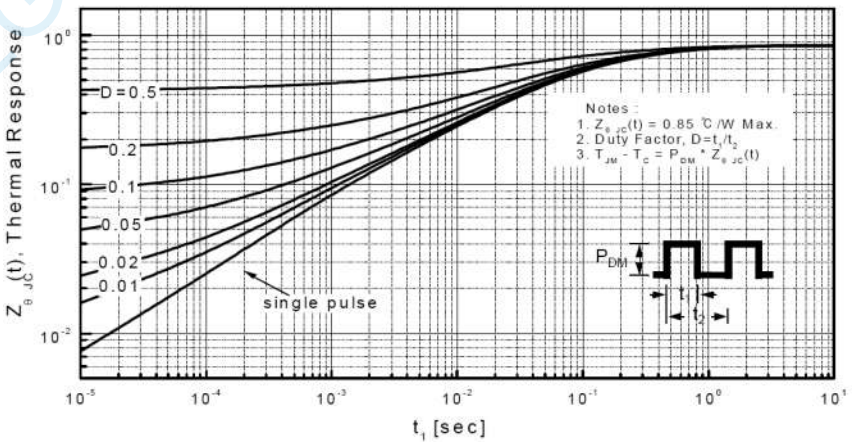
Maximum Safe Operating Area



Maximum Drain Current vs. Case Temperature



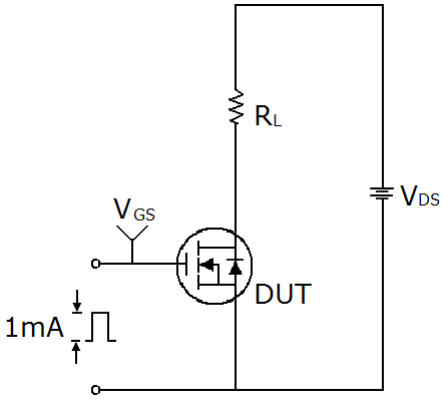
Transient Thermal Response Curve

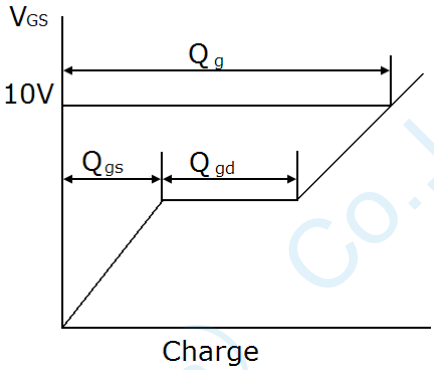


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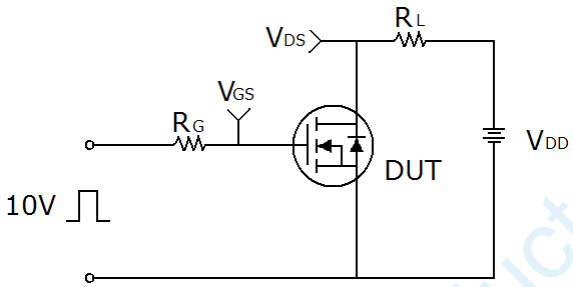
Test circuit

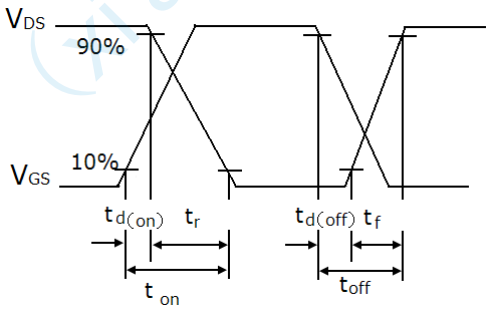
1）Gate charge test circuit & Waveform



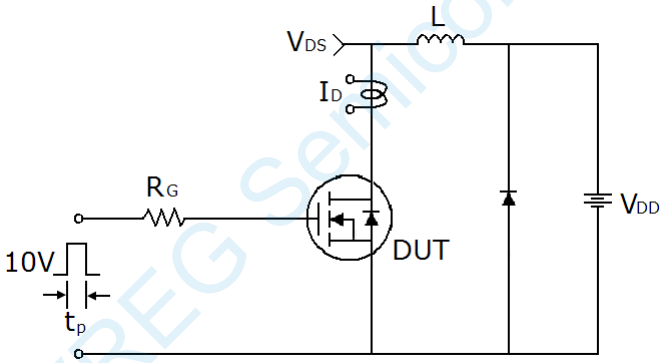


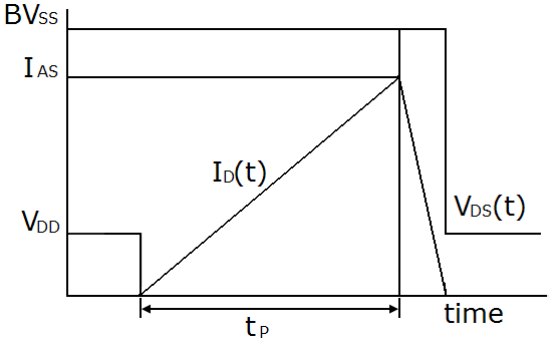
2）Switch Time Test Circuit:





3）Unclamped Inductive Switching Test Circuit & Waveforms

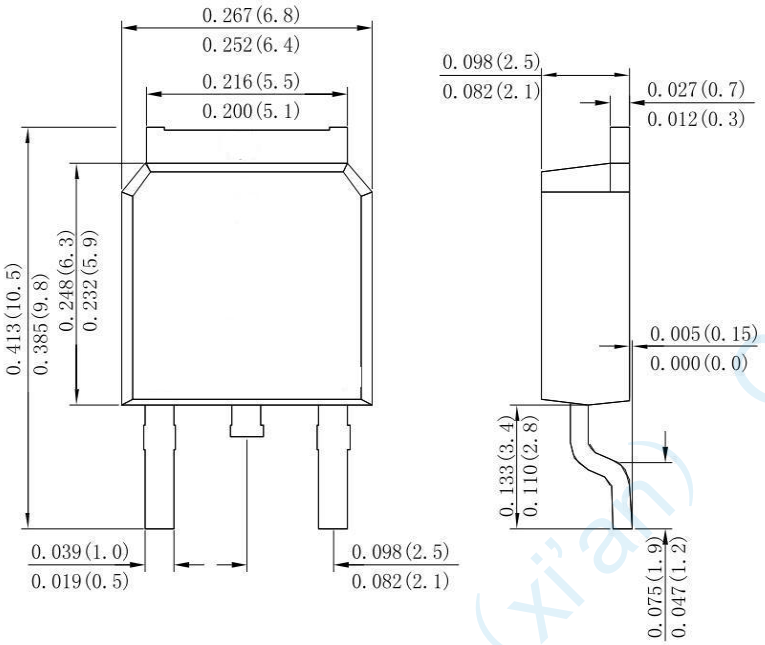




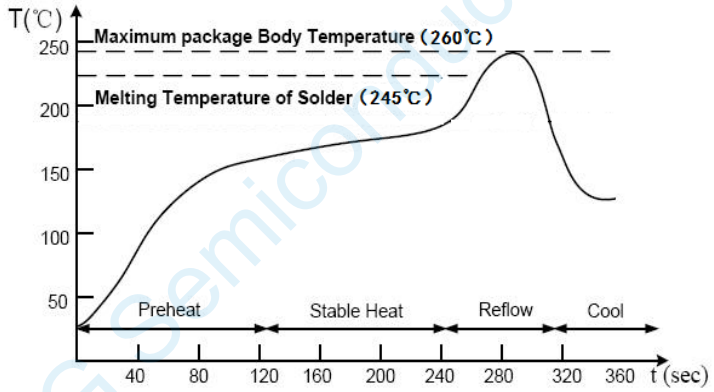
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Package Information

TO-252



Suggested Soldering Temperature Profile



Note

- Recommended reflow methods: IR, vapor phase oven, hot air oven, wave solder.
- The device can be exposed to a maximum temperature of 260°C for 10 seconds.
- Devices can be cleaned using standard industry methods and solvents.
- If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

Ordering Information

Package	Reel Size	Reel DIA. (mm)	Q'TY/Reel (Kpcs)	Box Size (mm)	QTY/Box (Kpcs)	Carton Size (mm)	Q'TY/Carton (Kpcs)
TO-252	13'	330	2.5	340	5.0	360*360*360	40

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