N-Channel, 650V, 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

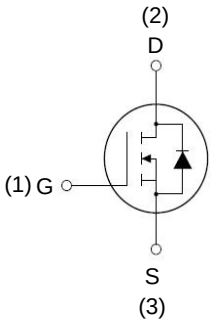
V_{DS} (V)	Typical $R_{DS(on)}$ (Ω)
650	1.212 @ V_{GS}=10V

Applications

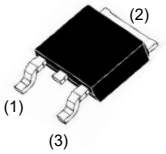
- ✧ LED power supplies
- ✧ Cell Phone Charger
- ✧ Standby Power

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}	650	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	60	W
Thermal Resistance，Junction-to-Case（Maximum）		$R_{\theta JC}$	2.08	℃/W
Thermal Resistance，Junction-to-Ambient （Maximum）		$R_{\theta JA}$	62	℃/W
Junction Temperature		T_J	150	℃
Storage Temperature		T_{STG}	-55~ +150	℃

OVREG Semiconductor (Xi'an) Co.,Ltd.

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
On/off states						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	650			V
Zero Gate Voltage Drain Current(Tc=25℃)	I_{DSS}	V_{DS}=650V,V_{GS}=0V			1	μA
Zero Gate Voltage Drain Current(Tc=125℃)	I_{DSS}	V_{DS}=520V,V_{GS}=0V			10	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±30V,V_{DS}=0V			±80	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	2.0		4.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=3.5A		1.212	1.453	Ω
Dynamic Characteristics						
Input Capacitance	C_{lss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz		435		pF
Output Capacitance	C_{oss}			28		pF
Reverse Transfer Capacitance	C_{rss}			3.3		pF
Total Gate Charge	Q_g	V_{DS}=480V,I_D=7A, V_{GS}=10V		11		nC
Gate-Source Charge	Q_{gs}			3.5		nC
Gate-Drain Charge	Q_{gd}			5		nC
Switching times						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=380V,I_D=3.5A, R_G=4.7Ω,V_{GS}=10V		8		nS
Turn-on Rise Time	t_r			7		nS
Turn-Off Delay Time	$t_{d(off)}$			58	75	nS
Turn-Off Fall Time	t_f			9	15	nS
Source- Drain Diode Characteristics						
Source-drain current(Body Diode)	I_{SD}	T_C=25°C			7	A
Pulsed Source-drain current(Body Diode)	I_{SDM}				28	A
Forward On Voltage	V_{SD}	Tj=25°C,I_{SD}=7A,V_{GS}=0V		0.9	1.2	V
Reverse Recovery Time	t_{rr}	Tj=25°C,I_F=3.5A,di/dt=100A/μs		210		nS
Reverse Recovery Charge	Q_{rr}			0.85		uC
Peak Reverse Recovery Current	I_{rrm}			8		A

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2. Tj=25℃,VDD=50V,VG=10V, R_G=25Ω

3. $R_{DS(on)}$ CP test results, typical, is 1.212Ω @V_{GS}=10V, I_D=1A

OVREG Semiconductor (Xi'an) Co.,Ltd.

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

Figure1. Safe operating area

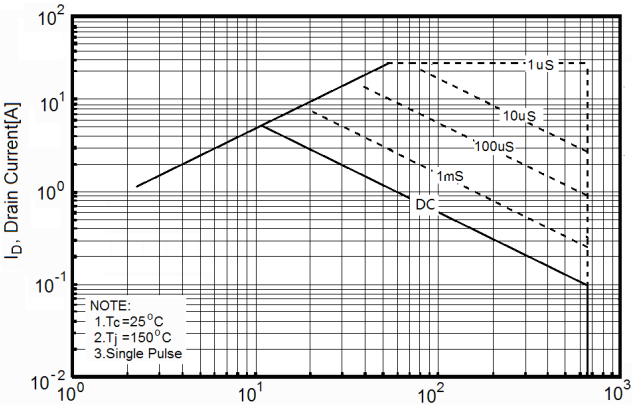


Figure2. Output characteristics

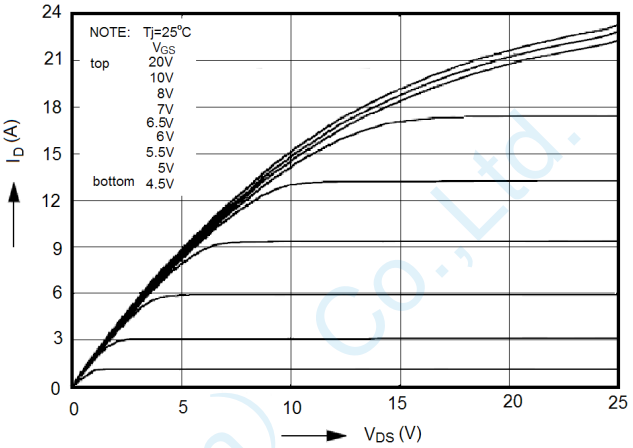


Figure3. Source-Drain Diode Forward Voltage

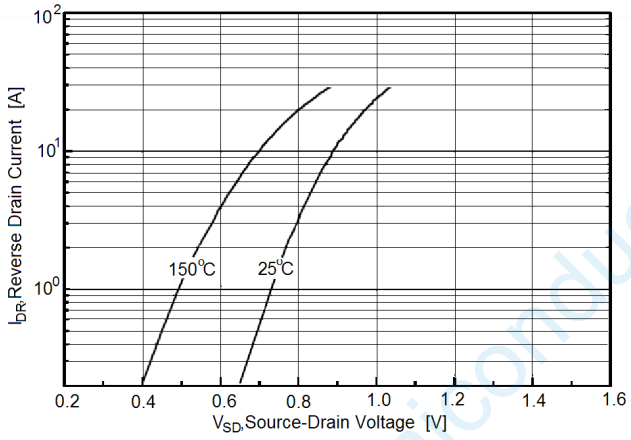


Figure4. Static drain-source on resistance

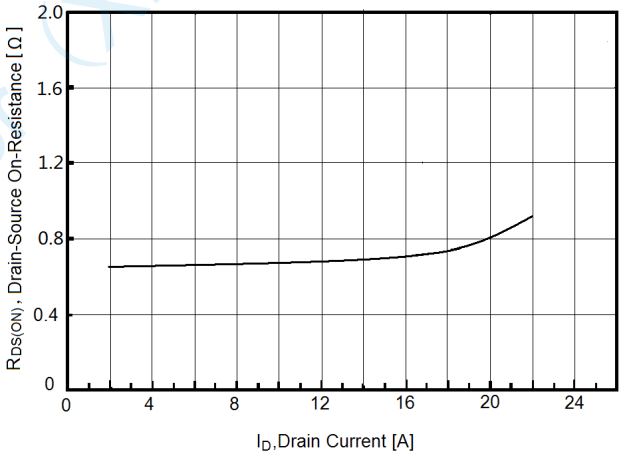


Figure5. Transfer characteristics

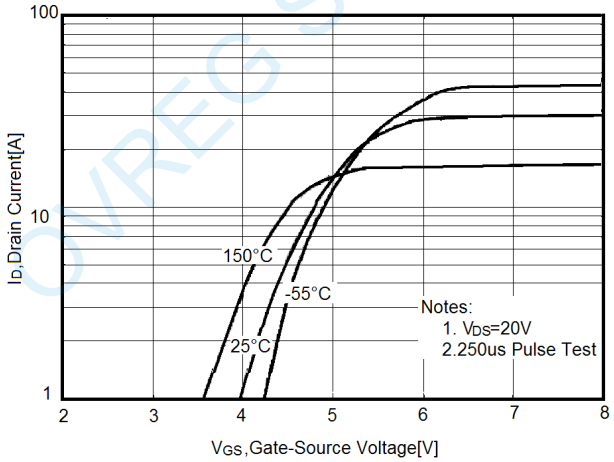
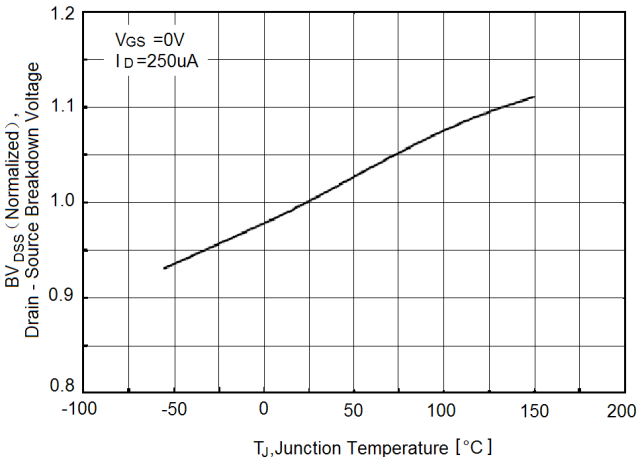


Figure6. BVDSS vs Junction Temperature



OVREG Semiconductor (Xi'an) Co.,Ltd.

Figure7. $R_{DS(ON)}$ vs Junction Temperature

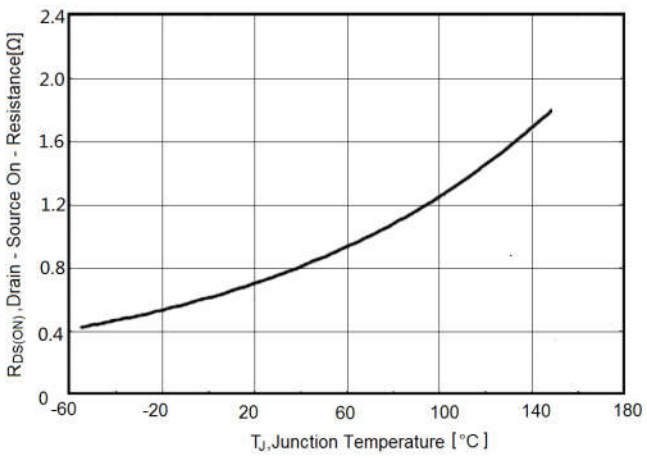


Figure8. Maximum I_D vs Junction Temperature

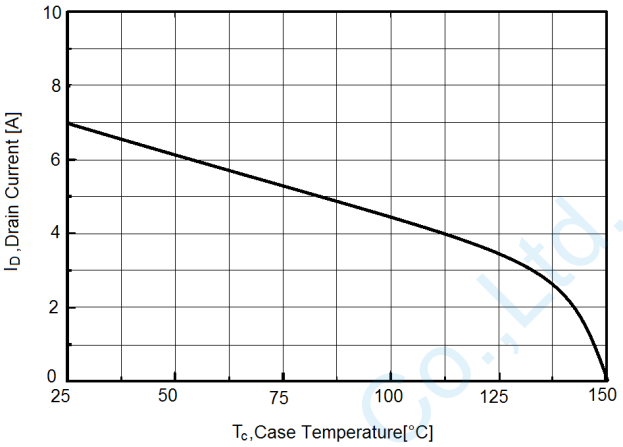


Figure9. Transient Thermal Impedance

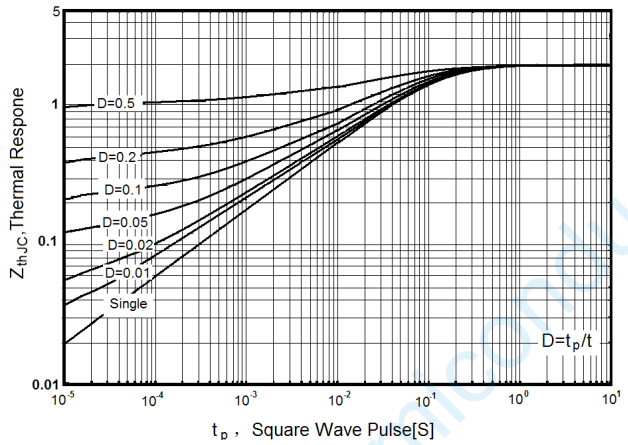


Figure10. Capacitance

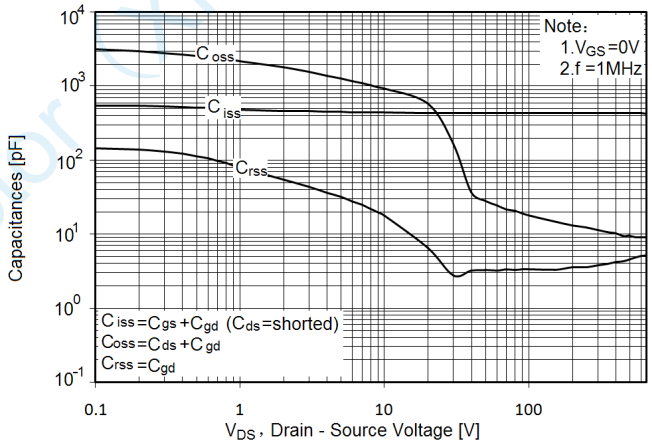
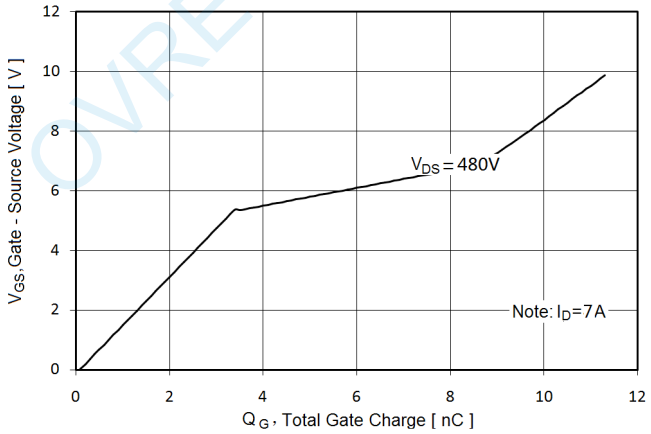


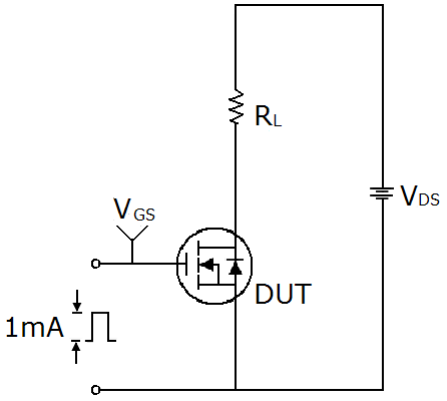
Figure11. Gate charge waveforms

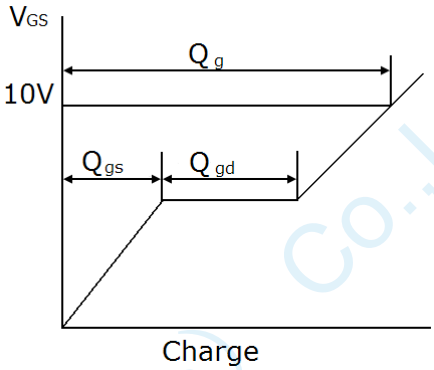


OVREG Semiconductor (Xi'an) Co.,Ltd.

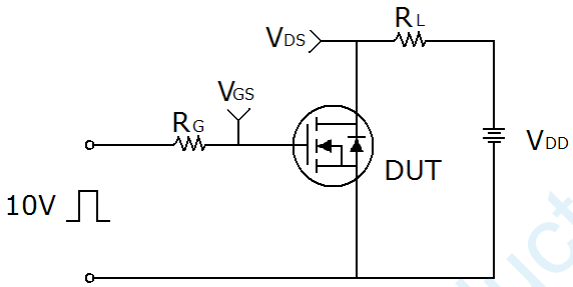
Test circuit

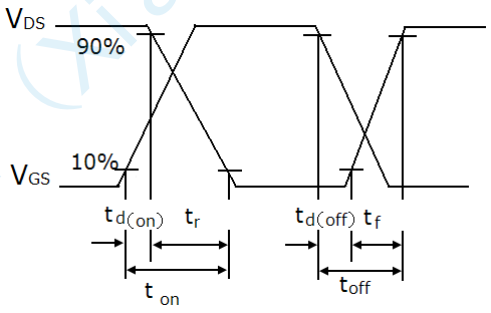
1）Gate charge test circuit & Waveform



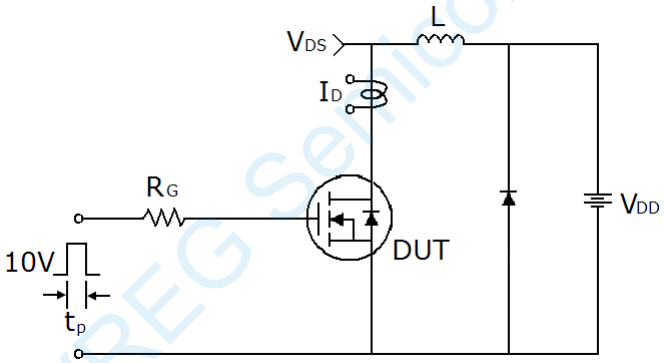


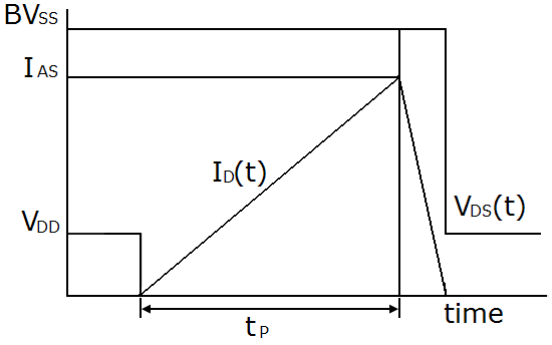
2）Switch Time Test Circuit:





3）Unclamped Inductive Switching Test Circuit & Waveforms

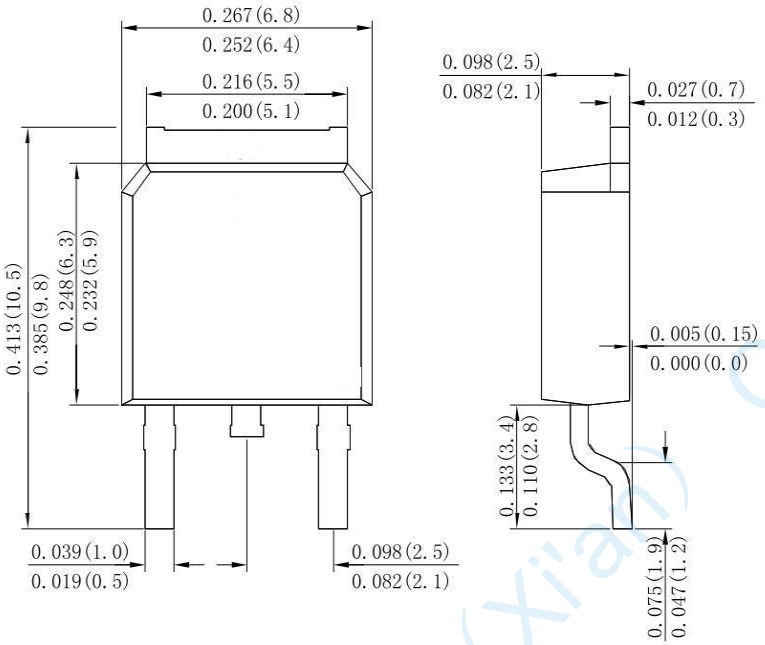




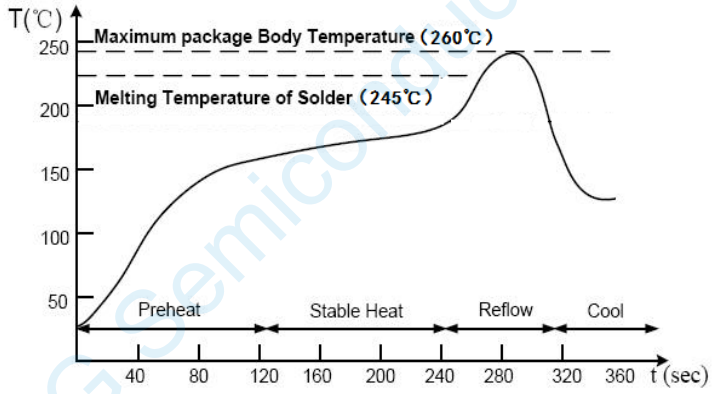
OVREG Semiconductor (Xi'an) Co.,Ltd.

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

OVREG Semiconductor (Xi'an) Co.,Ltd.