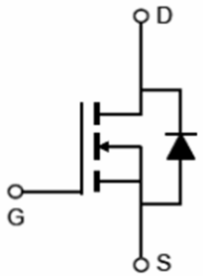
Main Product Characteristics:

V_{DSS}	30V
R_{DS}(on)	7mΩ(Typ.)
I_D	40A

TO-252 (DPAK)

Marking and Pin Assignments



Schematic Diagram

Features and Benefits:

- Advanced MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature

Description:

It utilizes the latest processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute Max Rating:

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current①	40	A
I_D @ T_C= 100°C	Continuous Drain Current ①	160	
I_{DM}	Pulsed Drain Current②	60	
P_D @T_C = 25°C	Power Dissipation③	70	W
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.5mH	65	mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

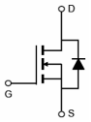
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	45	°C /W

Electrical Characterizes @T_A=25°C unless otherwise specified

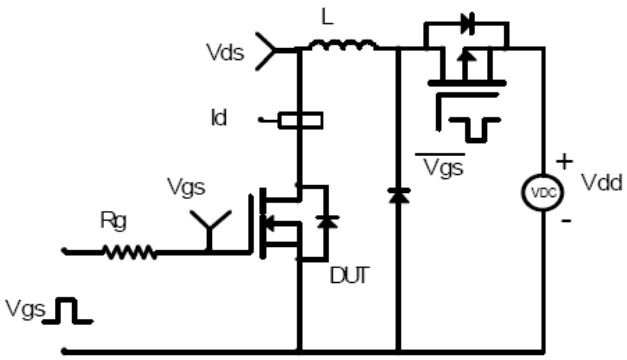
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	30	—	—	V	V_{GS} = 0V, I_D = 250μA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	7	8	mΩ	V_{GS}=10V,I_D =15A
		—	10	14		V_{GS}=4.5V,I_D =10A
$V_{GS(th)}$	Gate threshold voltage	1	—	2.5	V	V_{DS} = V_{GS}, I_D =250μA
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} =30V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =20V
		—	—	-100		V_{GS} = -20V
Q_g	Total gate charge	—	13	—	nC	I_D = 15A,
Q_{gs}	Gate-to-Source charge	—	3	—		V_{DS}=15V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	4	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on delay time	—	7.6	—	ns	V_{GS}=10V, V_{DD}=23V,
t_r	Rise time	—	18.2	—		R_{GEN}=3Ω
$t_{d(off)}$	Turn-Off delay time	—	27.7	—		I_D = 10A
t_f	Fall time	—	7.7	—		
C_{iss}	Input capacitance	—	987	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	124	—		V_{DS} = 30V
C_{rss}	Reverse transfer capacitance	—	108	—		f = 1MHz

Source-Drain Ratings and Characteristics

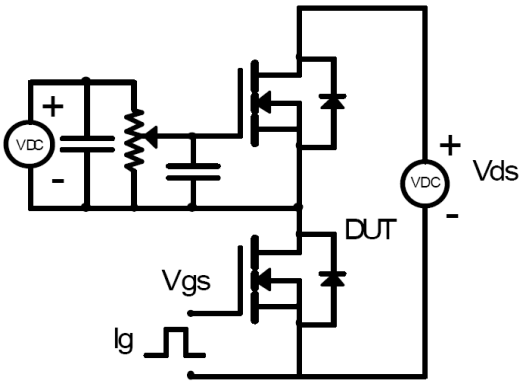
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	40	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	160	A	
V_{sd}	Diode Forward Voltage	—	—	1.2	V	I_S=15A, V_{GS}=0V
trr	Reverse Recovery Time	—	12	—	ns	T_J = 25°C, I_F =10A,
Qrr	Reverse Recovery Charge	—	4	—	nC	di/dt = 100A/μs

Test Circuits and Waveforms

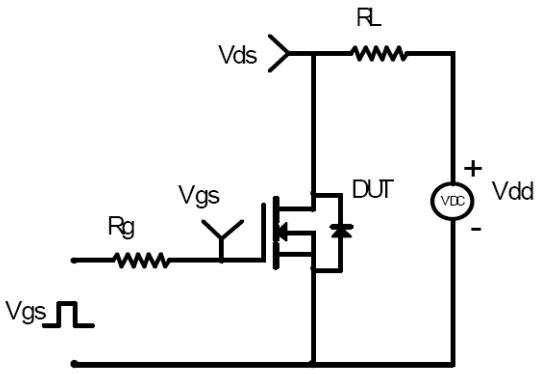
EAS Test Circuit:



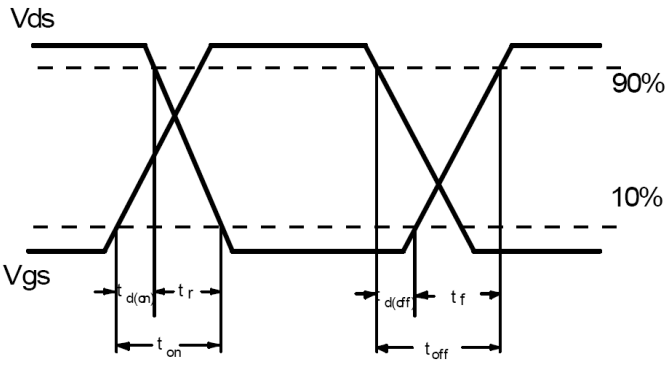
Gate Charge Test Circuit:



Switching Time Test Circuit:



Switching Waveforms:



Notes:

①Calculated continuous current based on maximum allowable junction temperature.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.

④The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_A =25 °C

Typical Electrical and Thermal Characteristics

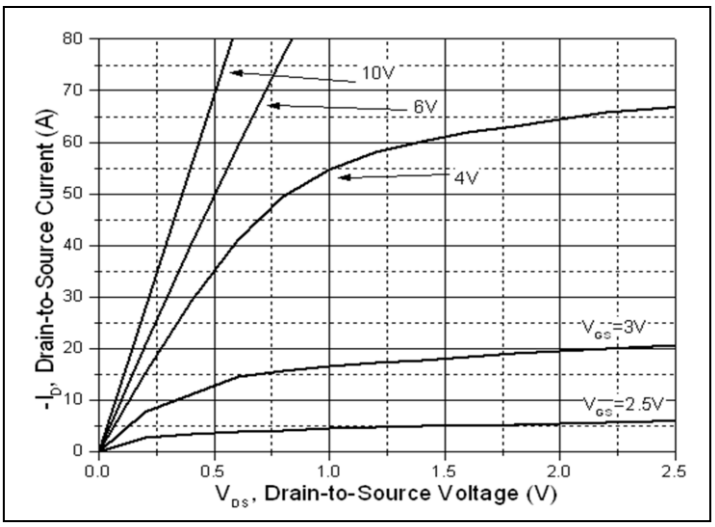


Figure 1. Typical Output Characteristics

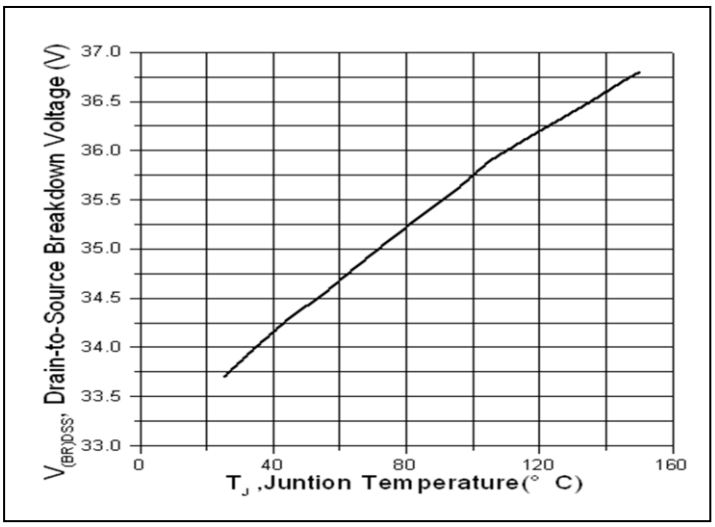


Figure2. Drain-to-Source Breakdown Voltage vs. Junction Temperature

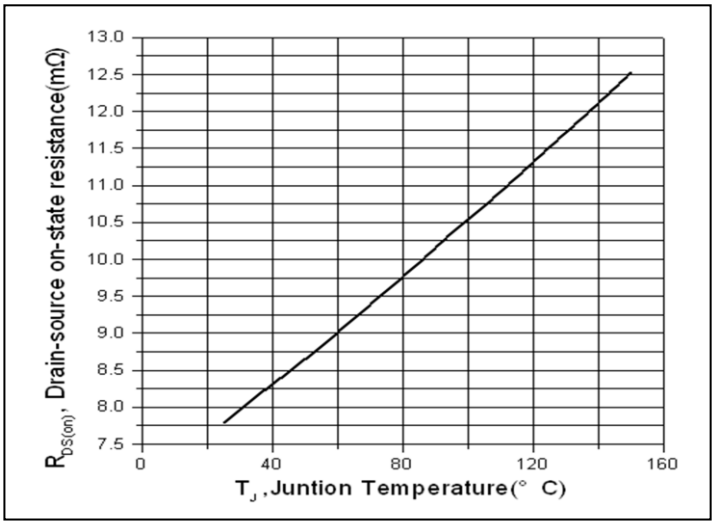


Figure 3. Normalized On-Resistance vs. Junction Temperature

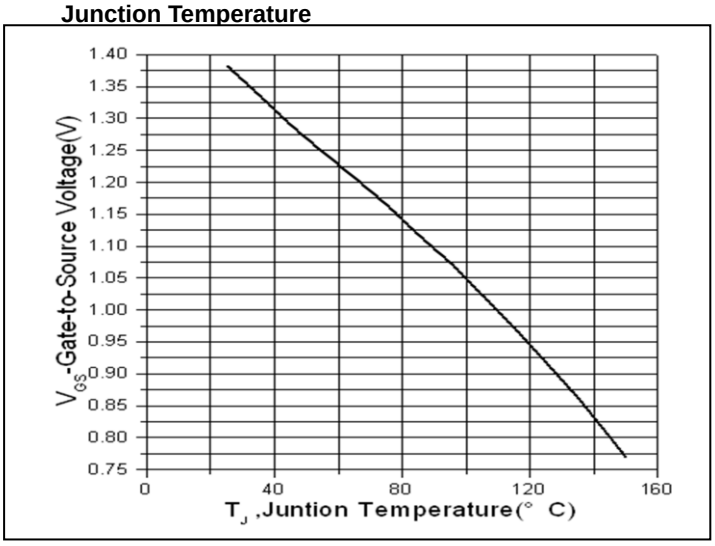


Figure 4. Normalized V_{GS}(th) vs. Junction Temperature

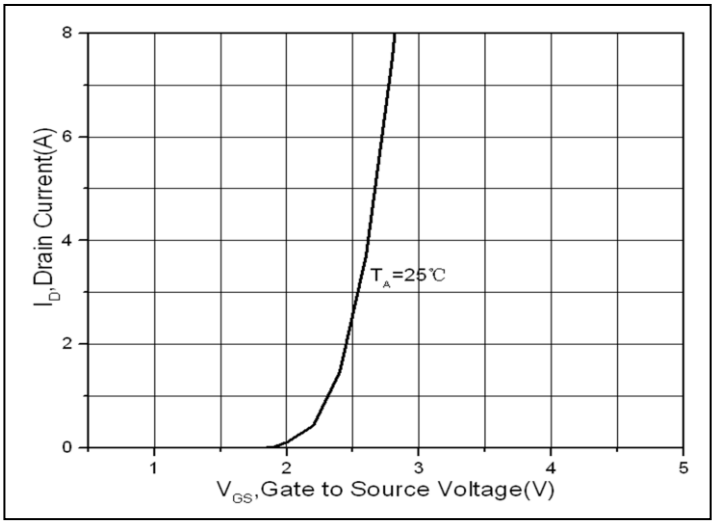


Figure 5. Transfer Characteristics

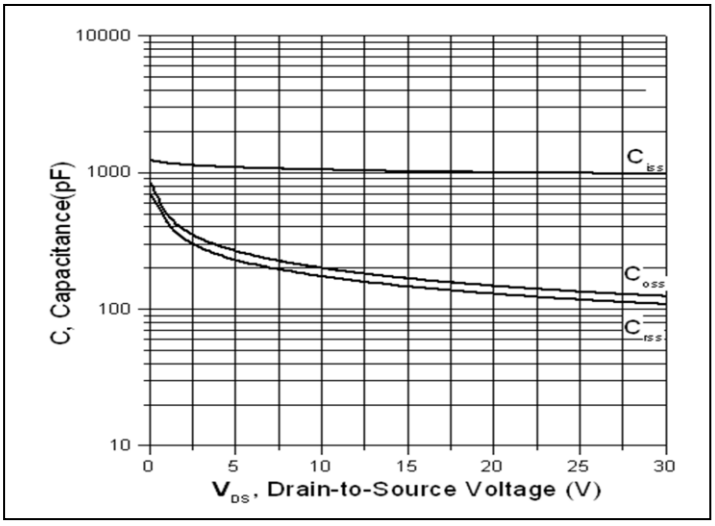


Figure 6. Capacitance Characteristics

Typical Electrical and Thermal Characteristics

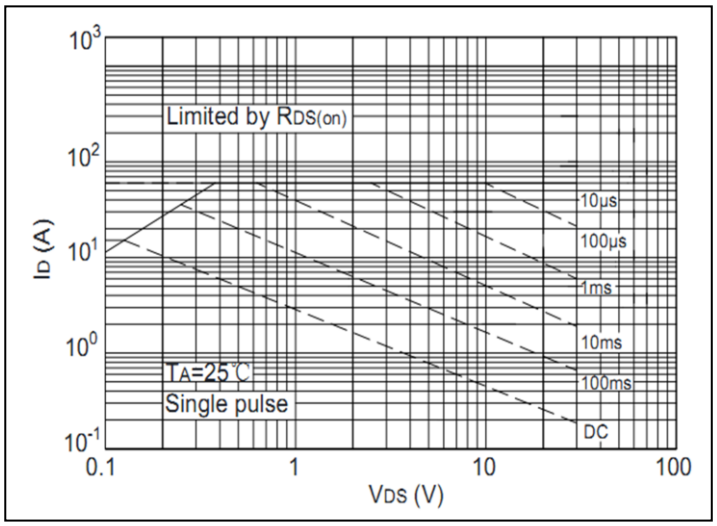


Figure 7. Safe Operation Area

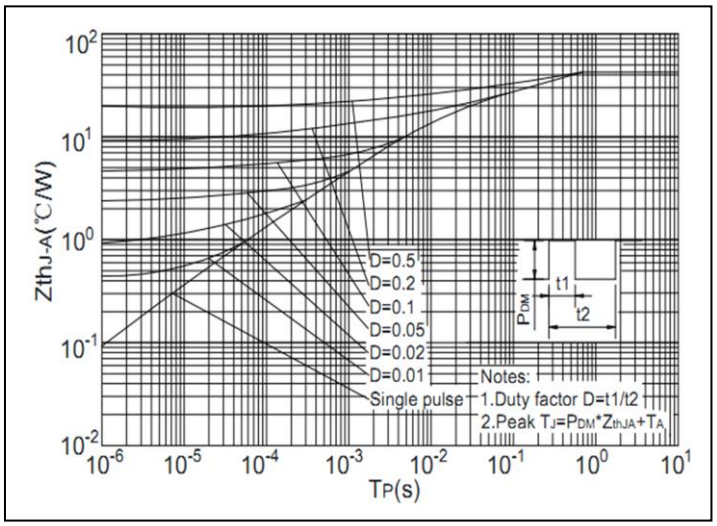
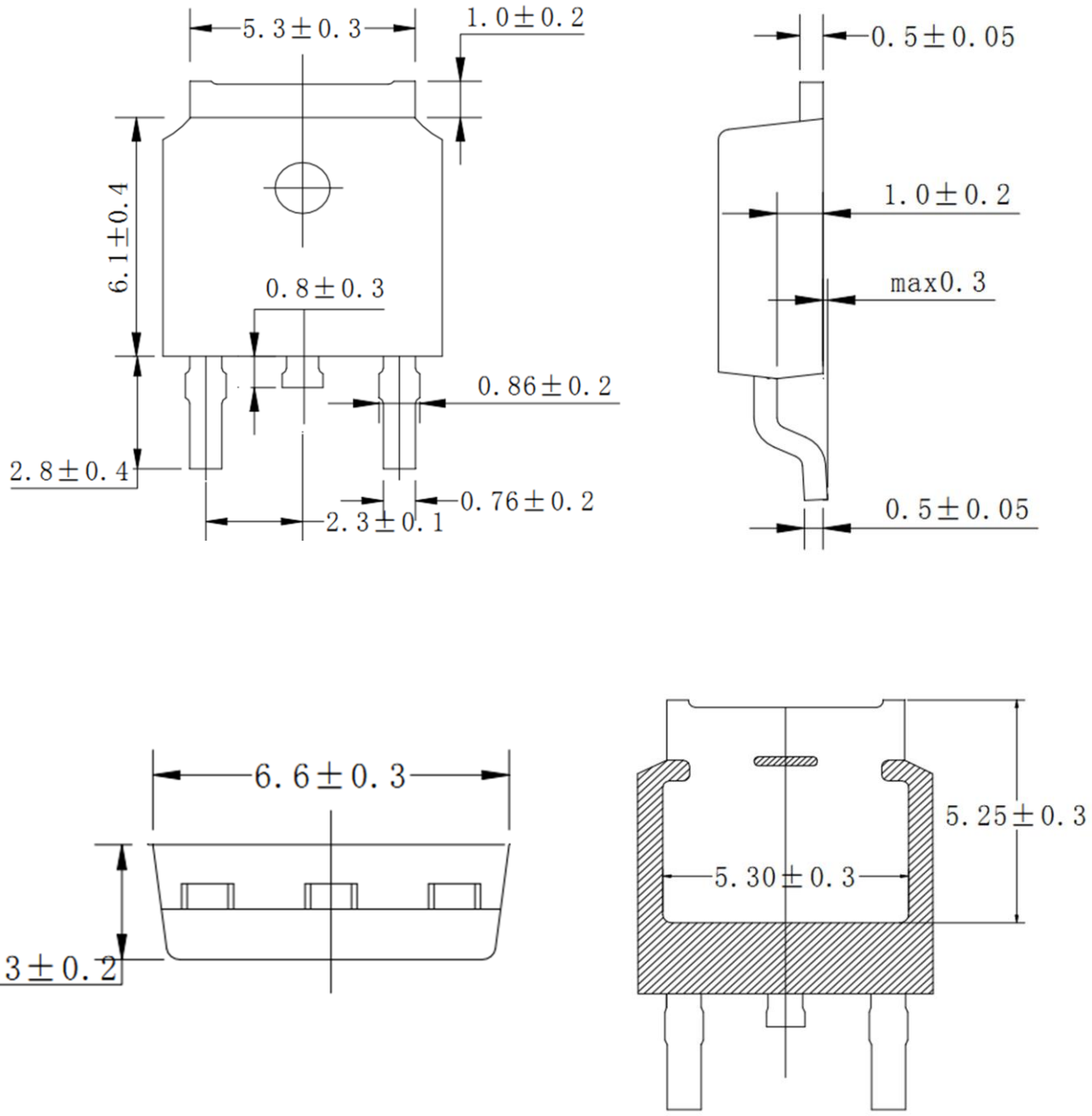


Figure 8. Transient Thermal Impedance

Mechanical Data：

TO-252 Package Outline(Unit:mm)



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