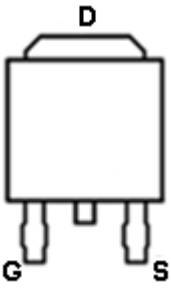
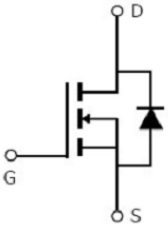
Main Product Characteristics

V_{DSS}	100V
R_{DS}(on)	16mΩ (typ.)
I_D	40A ①

TO-252



Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced 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℃ 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 @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	40	A
I_{DM}	Pulsed Drain Current ②	120	
P_D @TC = 25°C	Power Dissipation ③	72	W
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ L=0.3mH	30	mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

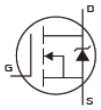
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	1.74	℃/W
$R_{\theta JA}$	Junction-to-ambient (t ≤ 10s) ④	—	62	°C/W

Electrical Characterizes @T_A=25℃ unless otherwise specified

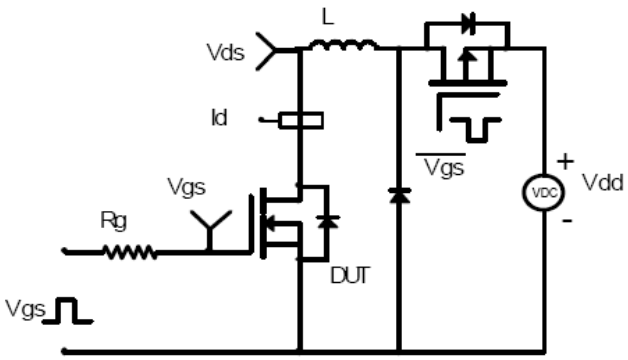
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	100	—	—	V	V_{GS} = 0V, I_D= 250uA
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	16	20	mΩ	V_{GS}=10V,I_D =8A
		—	—	26		V_{GS}=4.5V,I_D =6A
$V_{GS(th)}$	Gate threshold voltage	1	—	2.5	V	V_{DS} = V_{GS}, I_D =250μA
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	V_{DS} =100V,V_{GS} = 0V
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V_{GS} =20V
		—	—	-100		V_{GS} = -20V
Q_g	Total gate charge	—	19.5	—	nC	I_D = 8A,
Q_{gs}	Gate-to-Source charge	—	2.1	—		V_{DS}=50V,
Q_{gd}	Gate-to-Drain("Miller") charge	—	5.1	—		V_{GS} = 10V
$t_{d(on)}$	Turn-on delay time	—	17.5	—	nS	V_{GS}=10V, V_{DD} =50V,
t_r	Rise time	—	3.5	—		R_{GEN}=2.2Ω
$t_{d(off)}$	Turn-Off delay time	—	33.1	—		I_D =10A
t_f	Fall time	—	2.9	—		
C_{iss}	Input capacitance	—	1190	—	pF	V_{GS} = 0V
C_{oss}	Output capacitance	—	190	—		V_{DS} = 50V
C_{rss}	Reverse transfer capacitance	—	4	—		f = 1MHz

Source-Drain Ratings and Characteristics

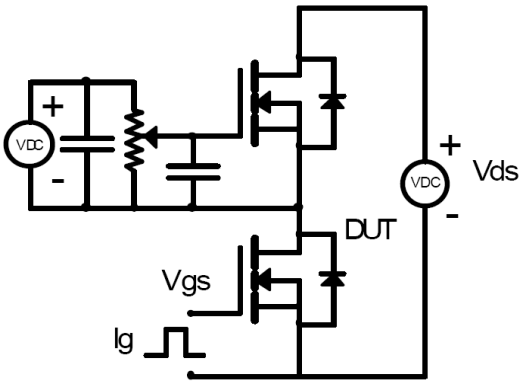
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode) ①	—	—	40	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	120	A	
V_{sd}	Diode Forward Voltage	—	—	1.3	V	I_S=8A, V_{GS}=0V, T_J = 25°C
t_{rr}	Reverse Recovery Time	—	50	—	nS	T_J = 25°C, I_F =8A,
Q_{rr}	Reverse Recovery Charge	—	95	—	nC	di/dt = 100A/μs

Test circuits and Waveforms

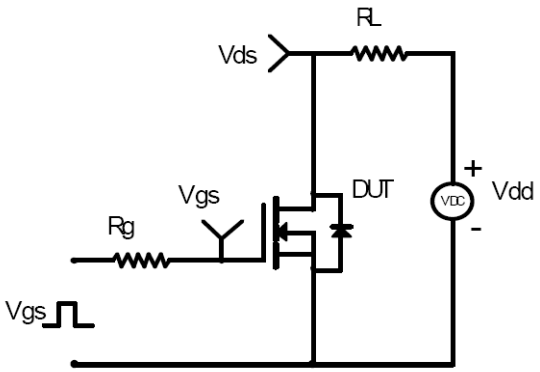
EAS Test Circuit:



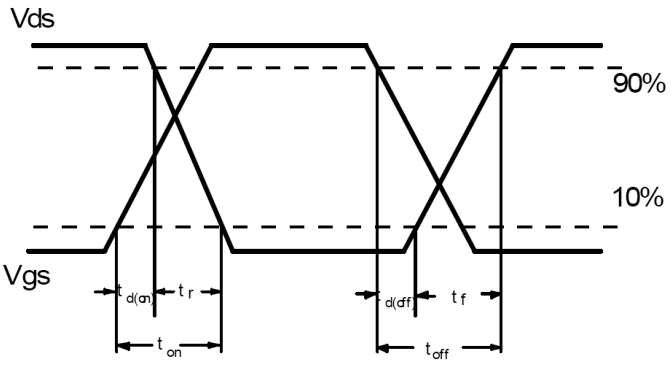
Gate charge test circuit:



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 TA =25°C

Typical electrical and thermal characteristics

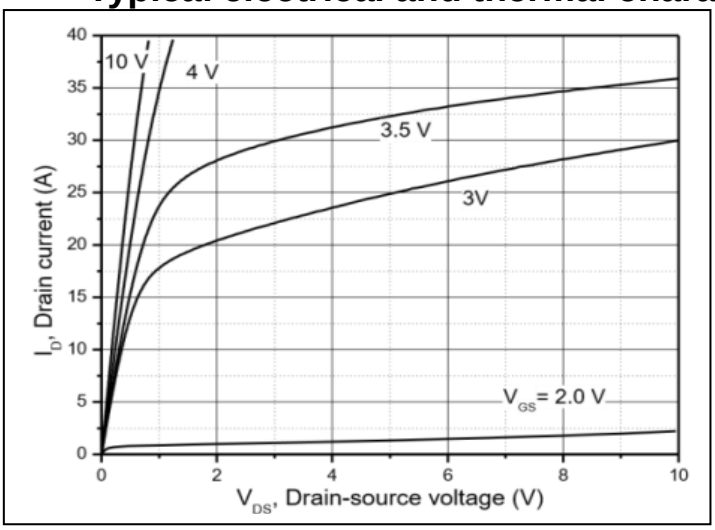


Figure 1: Typical Output Characteristics

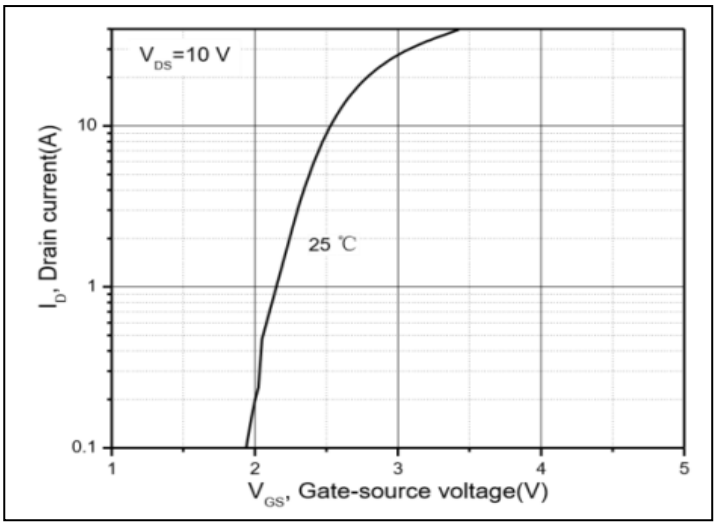


Figure 2: Type Transfer Characteristics

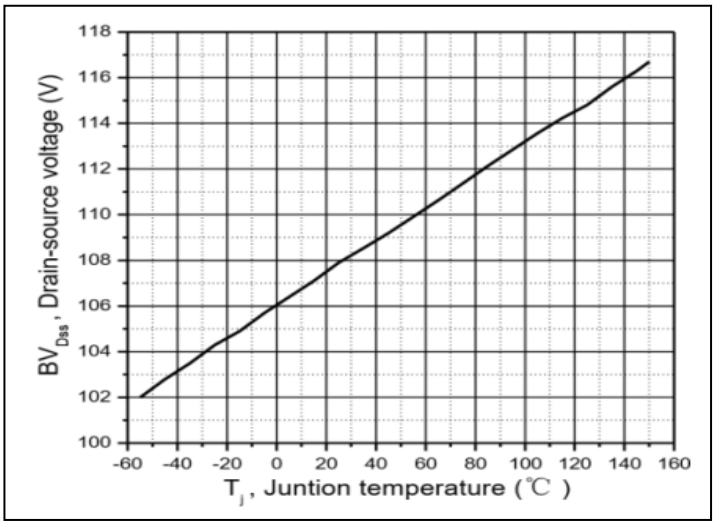


Figure 3: Drain-to-Source Breakdown Voltage vs. Junction Temperature

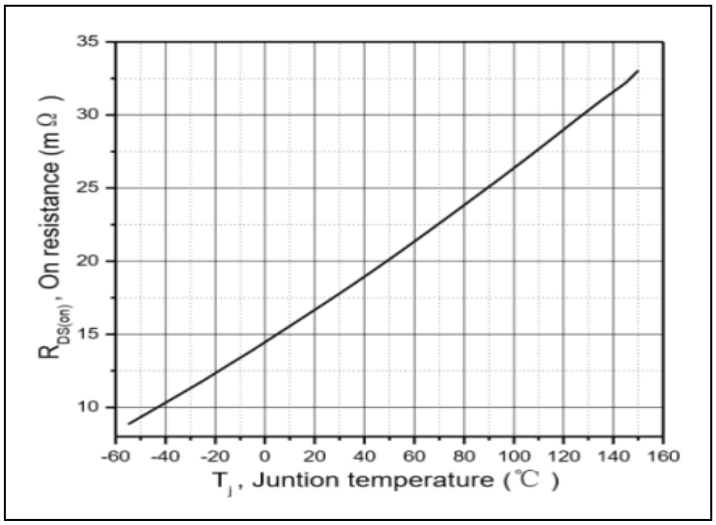


Figure 4: Normalized On-Resistance vs. Junction Temperature

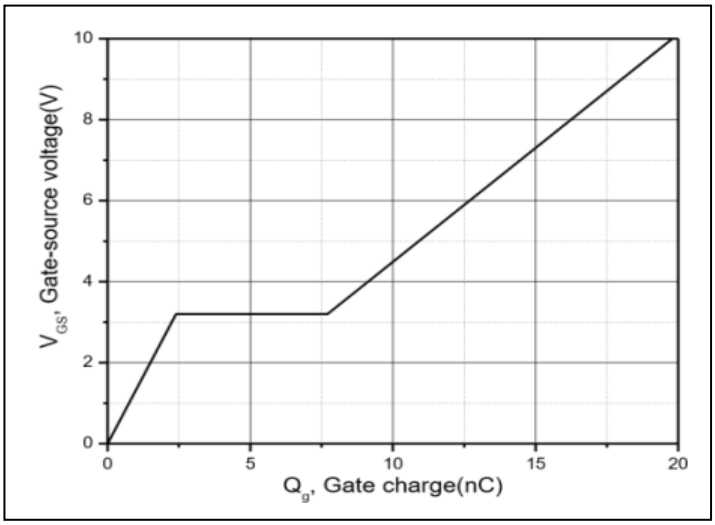


Figure 5: Gate Charge

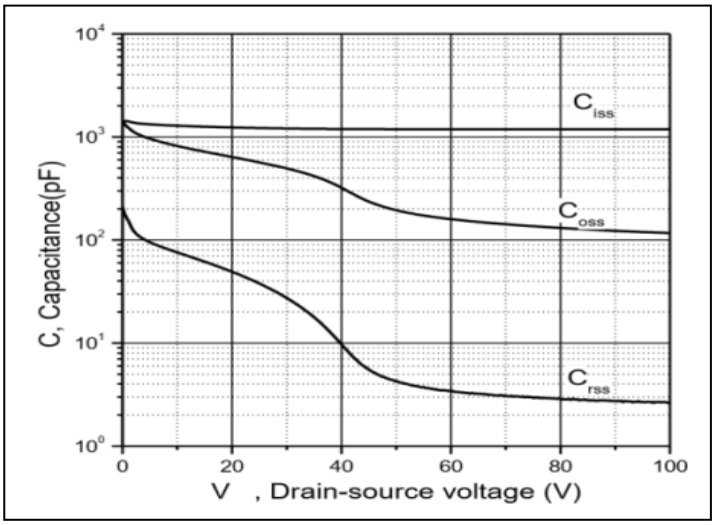


Figure 6: Capacitance

Typical electrical and thermal characteristics

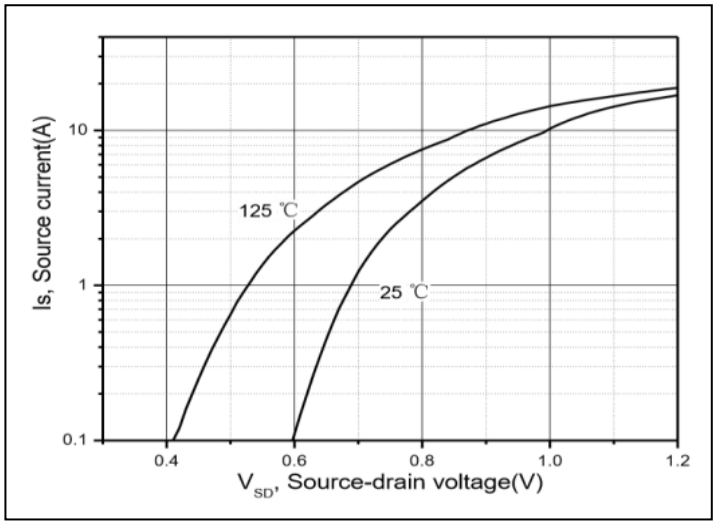


Figure 7: Forward Characteristics of Body Diode

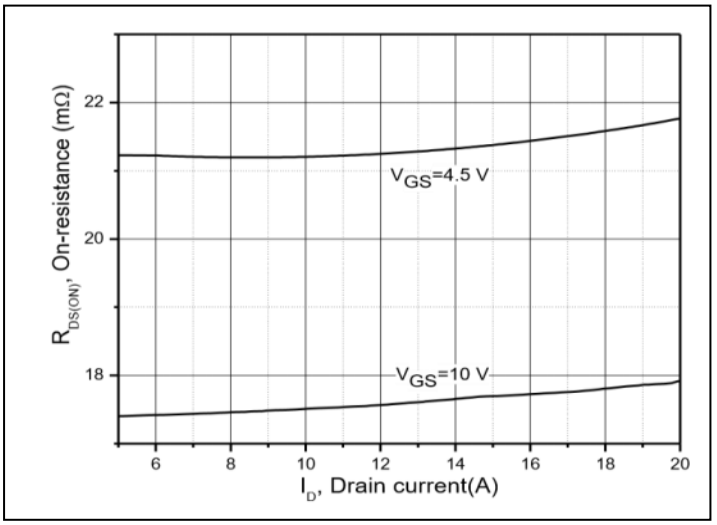


Figure 8: Drain-Source On-state Resistance

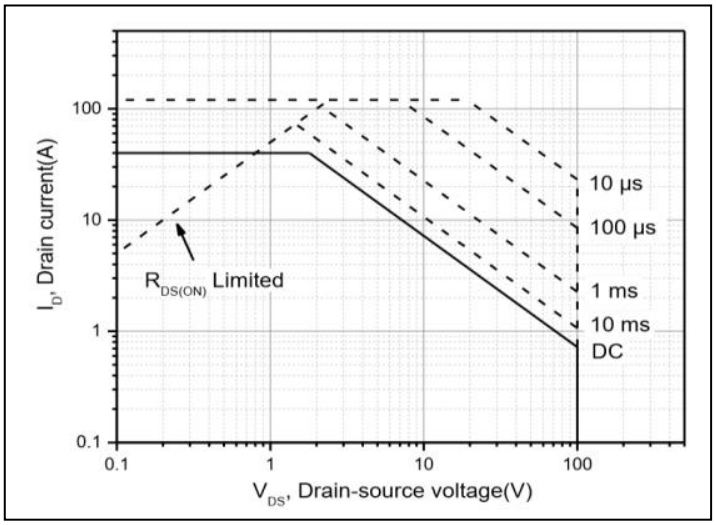
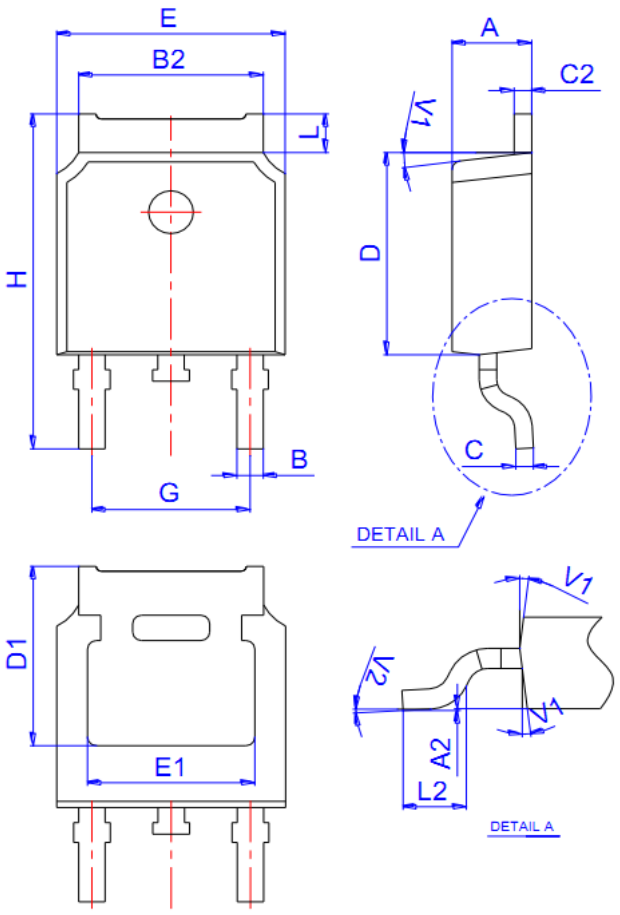


Figure 9: Safe Operation Area

Mechanical Data:



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.10		2.50	0.083		0.098
A2	0		0.10	0		0.004
B	0.66		0.86	0.026		0.034
B2	5.18		5.48	0.202		0.216
C	0.40		0.60	0.016		0.024
C2	0.44		0.58	0.017		0.023
D	5.90		6.30	0.232		0.248
D1	5.30REF			0.209REF		
E	6.40		6.80	0.252		0.268
E1	4.63			0.182		
G	4.47		4.67	0.176		0.184
H	9.50		10.70	0.374		0.421
L	1.09		1.21	0.043		0.048
L2	1.35		1.65	0.053		0.065
V1		7°			7°	
V2	0°		6°	0°		6°

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