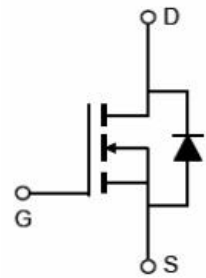


Main Product Characteristics:

V_{DSS}	100V
$R_{DS(on)}$	13.8m Ω (typ.)
I_D	30A


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 @ TC = 25°C	Continuous Drain Current, V_{GS} @ 10V ①	30	A
I_{DM}	Pulsed Drain Current ②	90	
P_D @ TC = 25°C	Power Dissipation ③	71	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	57	mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

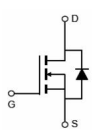
Thermal Resistance

Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	1.76	°C/W
$R_{\theta JA}$	Junction-to-ambient ④	—	62	

Electrical Characterizes @ $T_A=25^{\circ}\text{C}$ unless otherwise specified

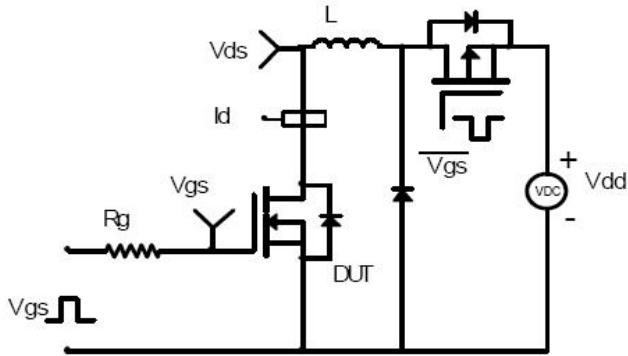
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	13.8	20	m Ω	$V_{GS}=10V, I_D=10A$
		—	17.4	26		$V_{GS}=4.5V, I_D=7A$
$V_{GS(th)}$	Gate threshold voltage	1.4	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
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	—	16.1	—	nC	$I_D = 5A,$ $V_{DS}=50V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source charge	—	2.5	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	4.1	—		
$t_{d(on)}$	Turn-on delay time	—	16.5	—	ns	$V_{GS}=10V, V_{DS}=50V,$ $R_{GEN}=10\Omega$ $I_D = 5A$
t_r	Rise time	—	3.5	—		
$t_{d(off)}$	Turn-Off delay time	—	75.5	—		
t_f	Fall time	—	45.8	—		
C_{iss}	Input capacitance	—	1000	—	pF	$V_{GS} = 0V$
C_{oss}	Output capacitance	—	185	—		$V_{DS} = 50V$
C_{rss}	Reverse transfer capacitance	—	10	—		$f = 100kHz$

Source-Drain Ratings and Characteristics

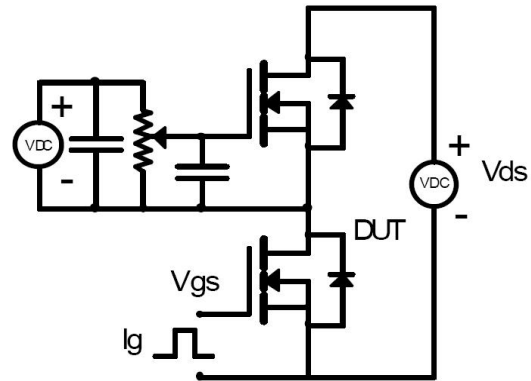
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	30	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	90	A	
V_{SD}	Diode Forward Voltage	—	—	1.3	V	$I_S=20A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	50	—	ns	$I_S=5A, di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	62	—	nC	

Test Circuits and Waveforms

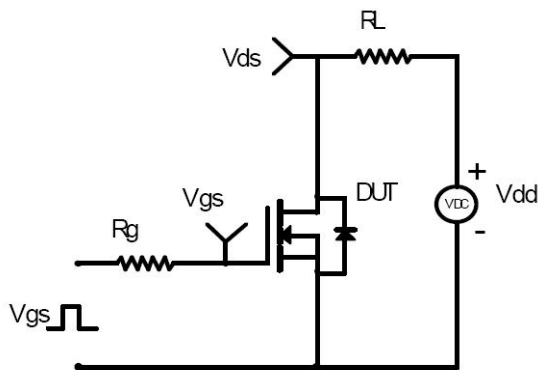
EAS Test Circuit:



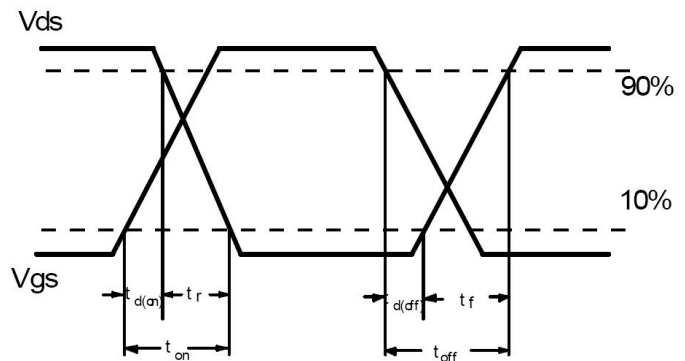
Gate Charge Test Circuit:



Switching Time Test Circuit:



Switching Waveforms:



Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The 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 $T_A = 25^\circ\text{C}$.

Typical Electrical and Thermal Characteristics

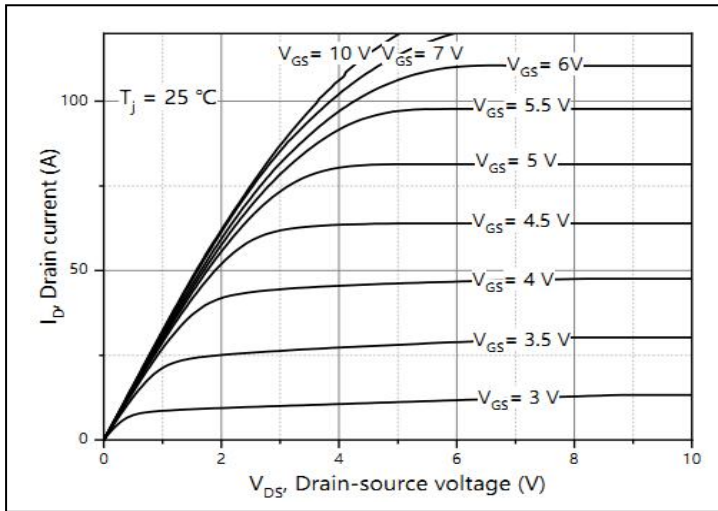


Figure 1. Typical Output Characteristics

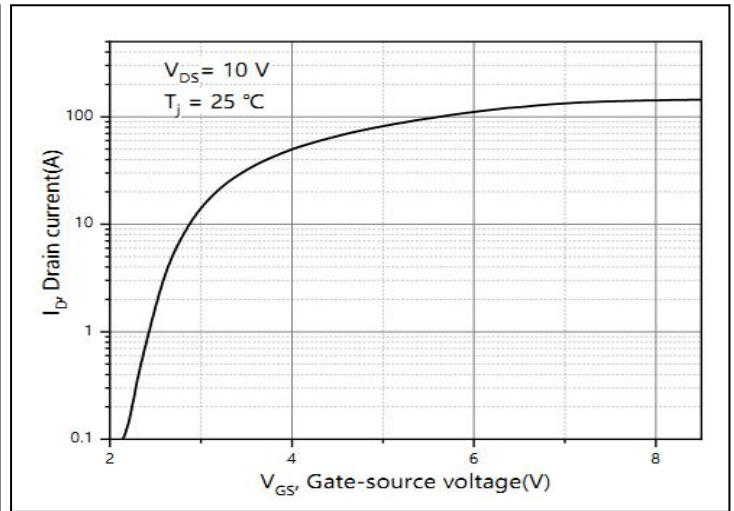


Figure 2. Transfer Characteristics

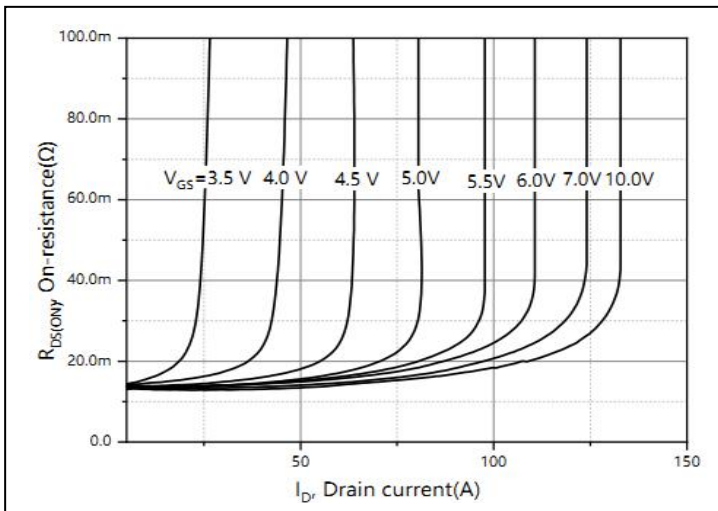


Figure 3. Drain-source On-state Resistance

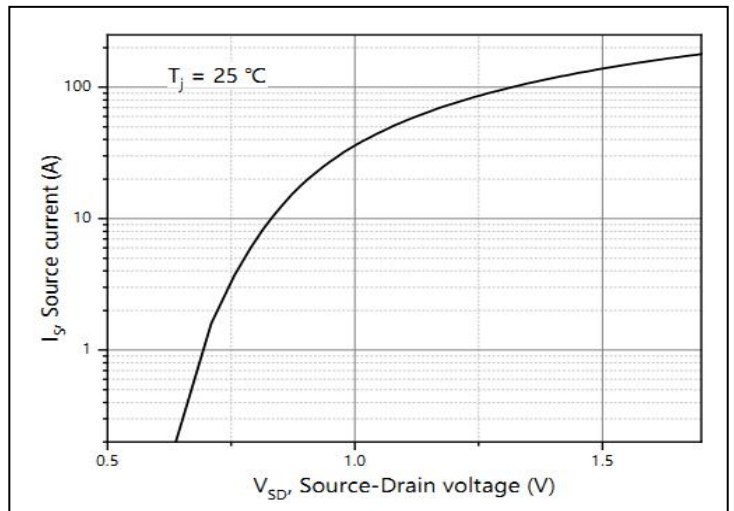


Figure 4. Body Diode Characteristics

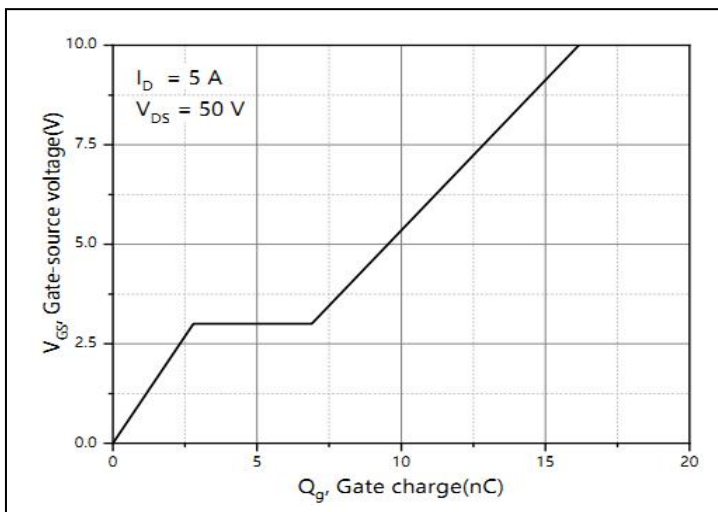


Figure 5. Gate Charge

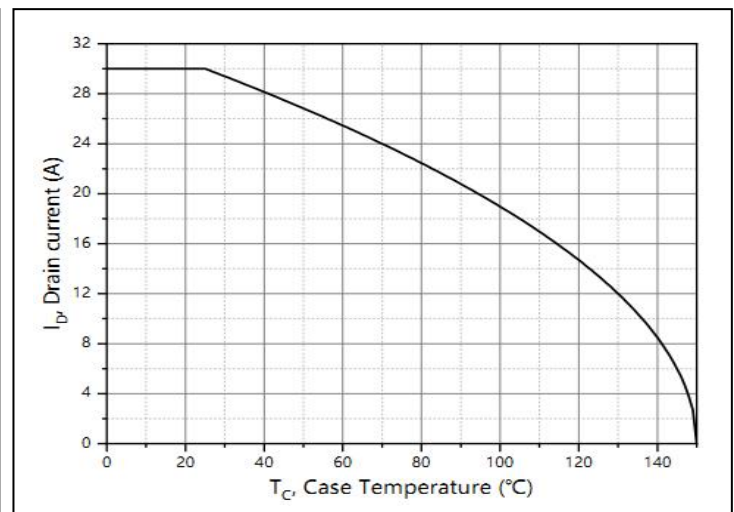


Figure 6. Drain Current vs. Case Temperature

Typical Electrical and Thermal Characteristics

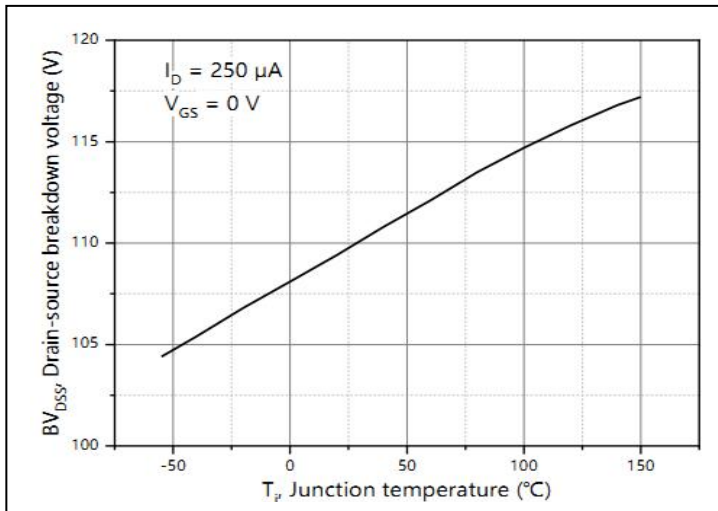


Figure 7. Drain-to-Source Breakdown Voltage vs. Temperature

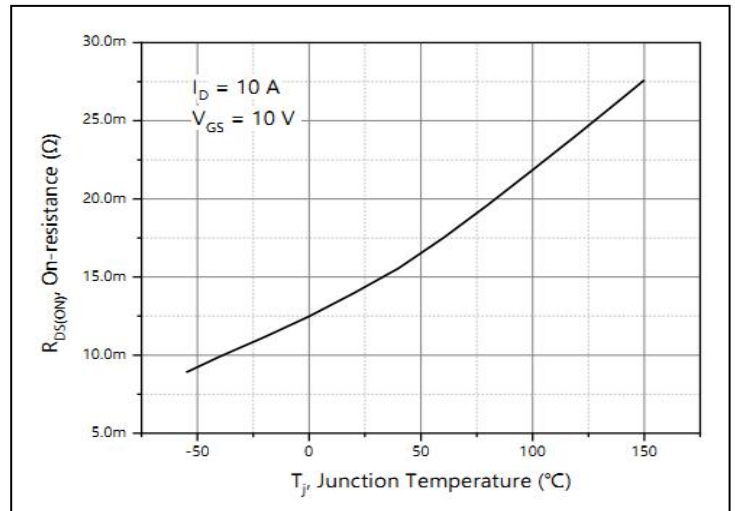


Figure 8. Normalized On-Resistance vs. Junction Temperature

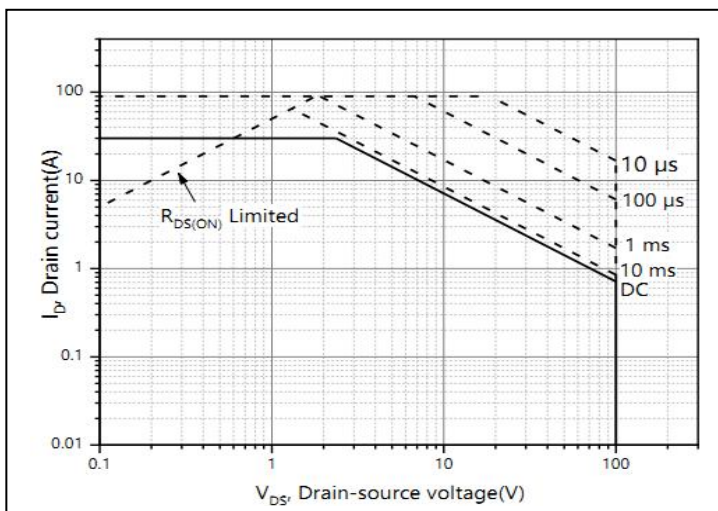
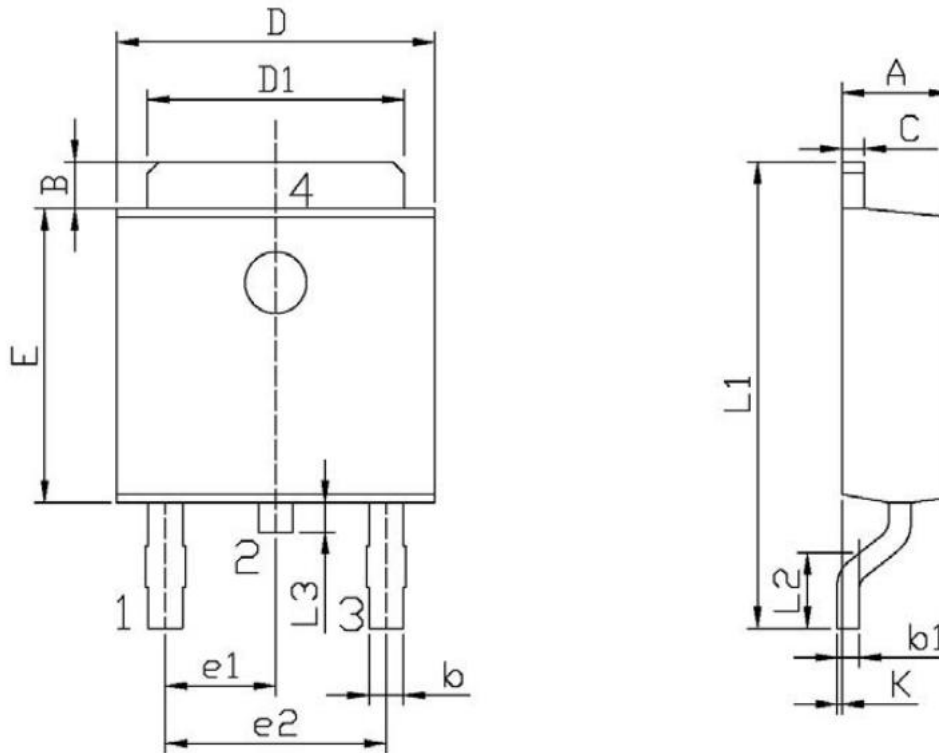


Figure 9. Safe Operating Area

Mechanical Data:

TO-252 Package Outline(Unit:mm)



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.50	0.70	e2	4.43	4.73
b1	0.45	0.55	L1	9.45	9.95
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.10	5.50	K	0.00	0.10

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