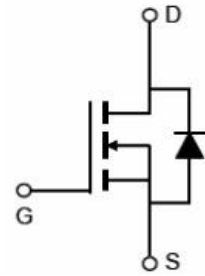


Main Product Characteristics:

V_{DSS}	85V
$R_{DS(on)}$	4.2mΩ(typ.)
I_D	120A


TO-252

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
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$ ①	120	A
I_{DM}	Pulsed Drain Current ②	480	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation ③	220	W
V_{DS}	Drain-Source Voltage	85	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ $L=0.1\text{mH}$	560	mJ
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +150	°C

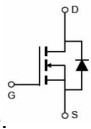
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ③	—	0.7	$^{\circ}\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ④	—	58	$^{\circ}\text{C}/\text{W}$

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

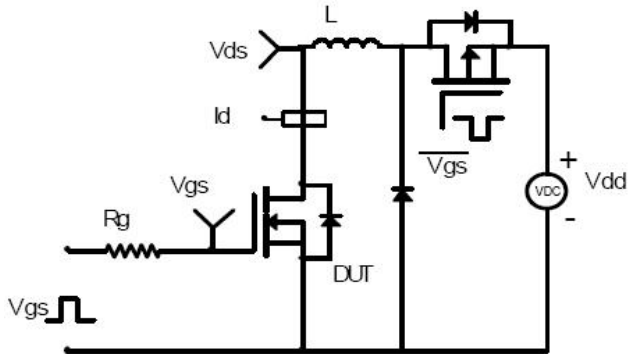
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	85	—	—	V	$V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	4.2	5.2	m Ω	$V_{GS} = 10\text{V}$, $I_D = 20\text{A}$
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 80\text{V}$, $V_{GS} = 0\text{V}$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{DS} = 0\text{V}$, $V_{GS} = 20\text{V}$
		—	—	-100		$V_{DS} = 0\text{V}$, $V_{GS} = -20\text{V}$
g_{fs}	Forward Transconductance ²	—	55	—	S	$V_{DS} = 5\text{V}$, $I_D = 20\text{A}$
Q_g	Total gate charge	—	61	—	nC	$I_D = 50\text{A}$, $V_{DS} = 40\text{V}$, $V_{GS} = 10\text{V}$
Q_{gs}	Gate-to-Source charge	—	21	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	11	—		
$t_{d(on)}$	Turn-on delay time	—	16.4	—	ns	$V_{GS} = 10\text{V}$ $V_{DS} = 40\text{V}$, $R_{GEN} = 3\Omega$ $I_D = 50\text{A}$
t_r	Rise time	—	51.5	—		
$t_{d(off)}$	Turn-Off delay time	—	37	—		
t_f	Fall time	—	8.2	—		
C_{iss}	Input capacitance	—	4645	—	pF	$V_{GS} = 0\text{V}$ $V_{DS} = 40\text{V}$ $f = 1\text{MHz}$
C_{oss}	Output capacitance	—	673	—		
C_{rss}	Reverse transfer capacitance	—	41	—		

Source-Drain Ratings and Characteristics

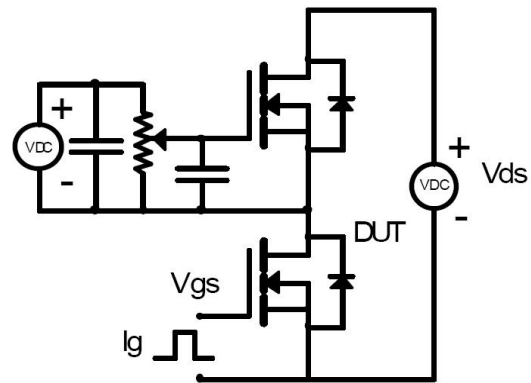
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	125	A	MOSFET symbol showing the integral reverse p-n junction diode. 
V_{SD}	Diode Forward Voltage	—	—	1.2	V	$I_S = 50\text{A}$, $V_{GS} = 0\text{V}$
t_{rr}	Reverse Recovery Time	—	69	—	ns	$I_S = 20\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	—	141	—	nC	

Test Circuits and Waveforms

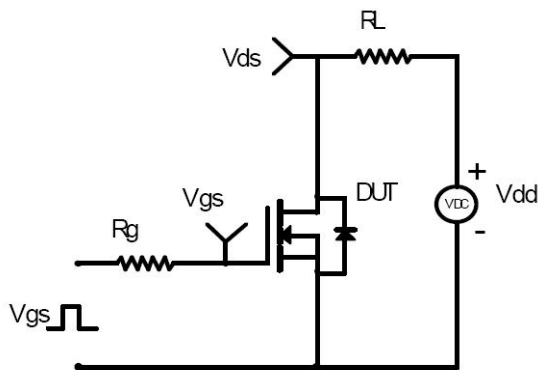
EAS Test Circuit:



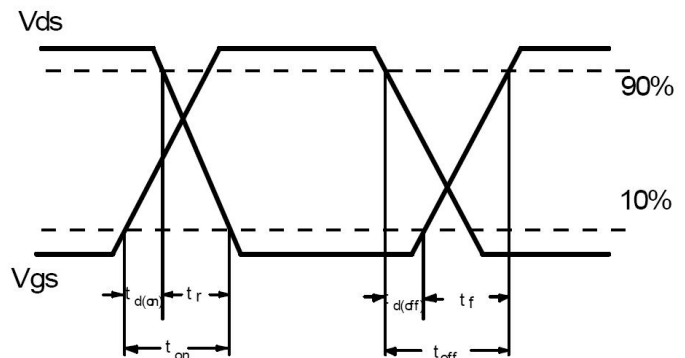
Gate Charge Test Circuit:



Switching Time Test Circuit:

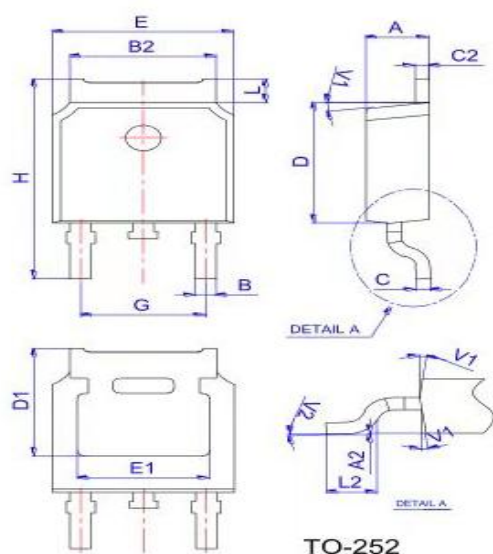


Switching Waveforms:

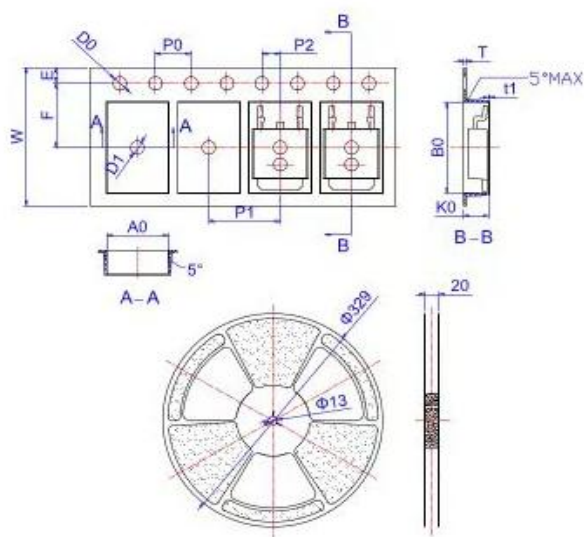


Notes:

- ① Calculated continuous current based on maximum allowable junction temperature.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation P_D 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 $T_A = 25^\circ \text{C}$.

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°



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
W	15.90	16.00	16.10	0.626	0.630	0.634
E	1.65	1.75	1.85	0.065	0.069	0.073
F	7.40	7.50	7.60	0.291	0.295	0.299
D0	1.40	1.50	1.60	0.055	0.059	0.063
D1	1.40	1.50	1.60	0.055	0.059	0.063
P0	3.90	4.00	4.10	0.154	0.157	0.161
P1	7.90	8.00	8.10	0.311	0.315	0.319
P2	1.90	2.00	2.10	0.075	0.079	0.083
A0	6.85	6.90	7.00	0.270	0.271	0.276
B0	10.45	10.50	10.60	0.411	0.413	0.417
K0	2.68	2.78	2.88	0.105	0.109	0.113
T	0.24		0.27	0.009		0.011
t1	0.10			0.004		
10P0	39.80	40.00	40.20	1.567	1.575	1.583

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