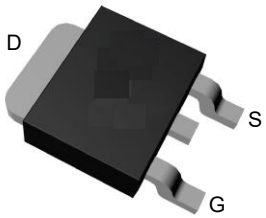
40V, 150A N-Channel Enhancement Mode MOSFET

Features

- V_{DS}= 40V, I_D= 150A
- $R_{DS(ON)}$≤ 3.2mΩ (2.4mΩ Typ.) @V_{GS}=10V
- $R_{DS(ON)}$≤ 4.0mΩ (3.3mΩ Typ.) @V_{GS}=4.5V
- Rugged and Reliable
- 100% UIS & R_g Tested
- Lead-Free, RoHS Compliant

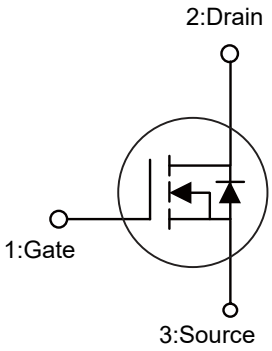
TO-252



Applications

- OR-ing
- Synchronous Rectifier for Server
- Battery Charger and Power Circuits
- DC-DC Converters
- CPU Power Delivery
- Load Switch / Power Management

Schematic Diagram (NMOS)



Mechanical Data

- TO-252 Small Outline Plastic Package
- Epoxy UL: 94V-0
- Mounting Position: Any

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Symbol	Parameter		Rating	Unit
Common Ratings				
V_{DSS}	Drain-Source Voltage		40	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		-55 to 175	
I_S	Diode Continuous Forward Current	T_C=25°C	150	A
I_D	Continuous Drain Current	T_C=25°C	150	A
		T_C=100°C	113	
I_{DM} [1]	Pulsed Drain Current	T_C=25°C	450	
P_D	Maximum Power Dissipation	T_C=25°C	125	W
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	1	°C/W
$R_{\theta JA}$ [2]	Thermal Resistance-Junction to Ambient	Steady State	25	°C/W
I_{AS} [3]	Avalanche Current, Single pulse	L=0.1mH	90	A
E_{AS} [3]	Avalanche Energy, Single pulse	L=0.1mH	405	mJ

Note 1: Pulse width limited by maximum junction temperature.
Note 2: Surface mounted on 1in^2 pad area.
Note 3: UIS tested and pulse width limited by maximum junction temperature (initial temperature T_j=25°C).

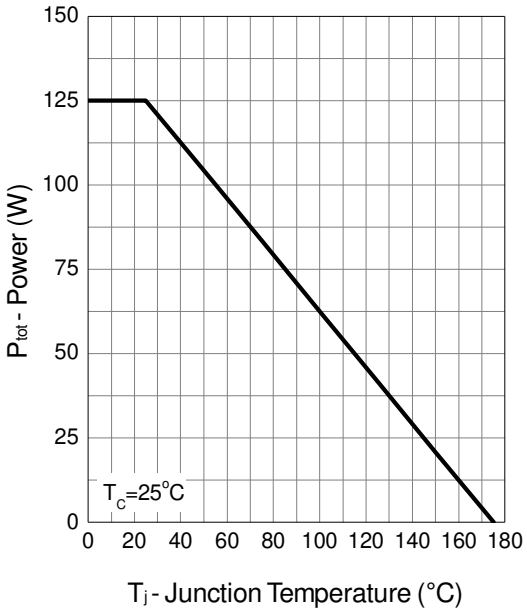
Electrical Characteristics (T_A=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	40	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=32V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1.4	1.7	2.5	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [4]	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=25A	-	2.4	2.7	mΩ
		V_{GS}=4.5V, I_{DS}=20A	-	3.3	4	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=20A	-	42	-	S
Diode Characteristics						
V_{SD} [4]	Diode Forward Voltage	I_{SD}=20A, V_{GS}=0V	-	0.8	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=5A, dI_{SD}/dt=100A/μs V_{dd}=20V	-	55	-	ns
Q_{rr}	Reverse Recovery Charge		-	67	-	nC
Dynamic Characteristics[5]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	0.88	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, Frequency=1.0MHz	-	5296	-	pF
C_{oss}	Output Capacitance		-	815	-	
C_{rss}	Reverse Transfer Capacitance		-	630	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=20V, R_L=20Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	18	-	ns
t_r	Turn-on Rise Time		-	73	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	84	-	
t_f	Turn-off Fall Time		-	33	-	
Gate Charge Characteristics[5]						
Q_g	Total Gate Charge	V_{DS}=20V, V_{GS}=10V, I_{DS}=25A	-	163	-	nC
Q_{gs}	Gate-Source Charge		-	16	-	
Q_{gd}	Gate-Drain Charge		-	44	-	

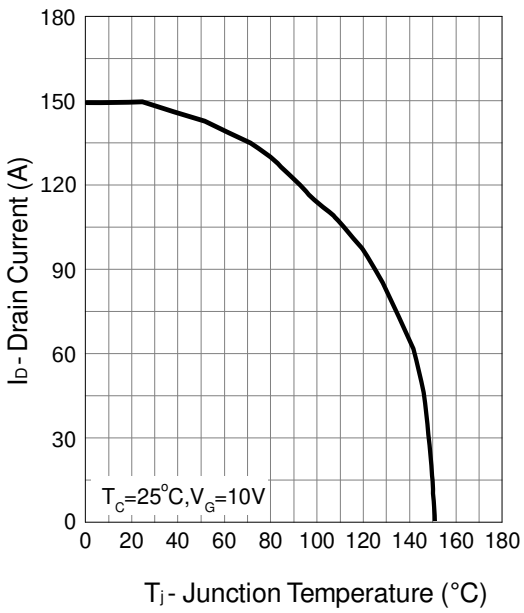
Note 4: Pulse test; pulse width≤300ms, duty cycle≤2%.
Note 5: Guaranteed by design, not subject to production testing.

Typical Operating Characteristics (T_A=25°C unless otherwise noted)

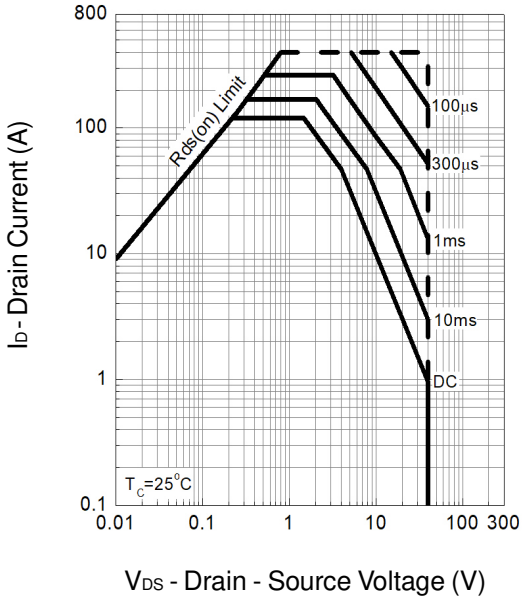
Power Dissipation



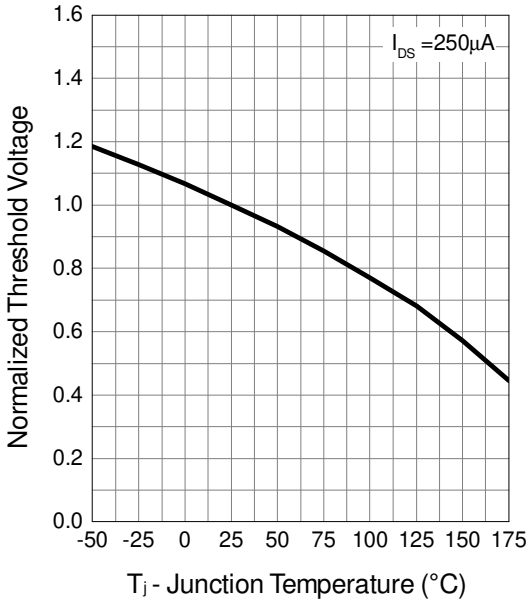
Drain Current



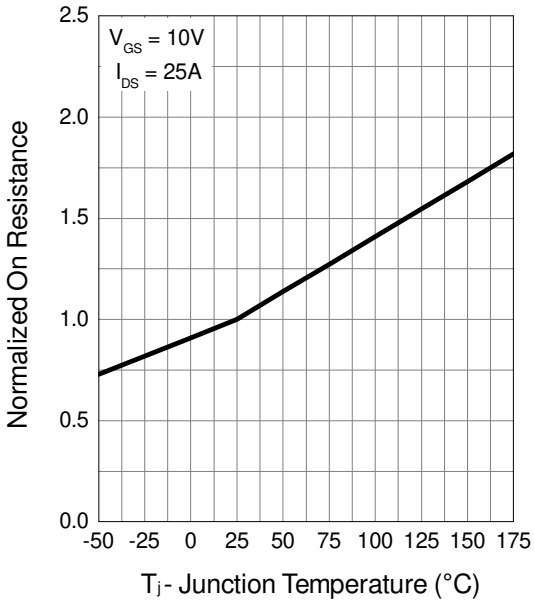
Safe Operation Area



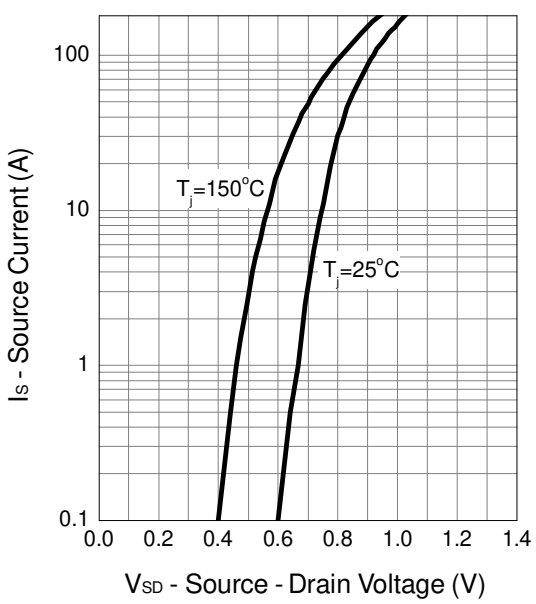
Gate Threshold Voltage



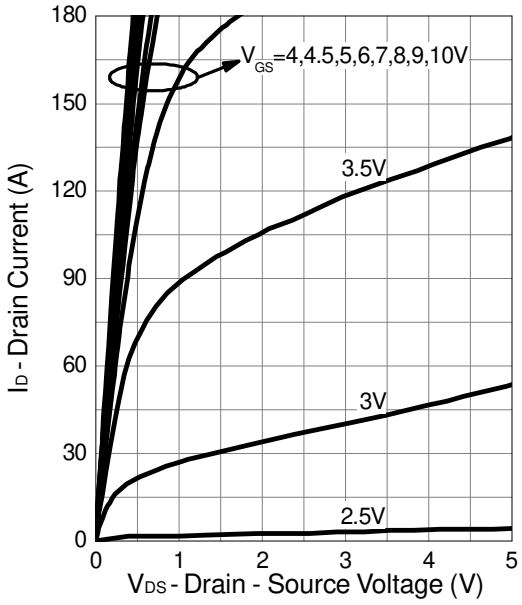
Drain-Source On Resistance



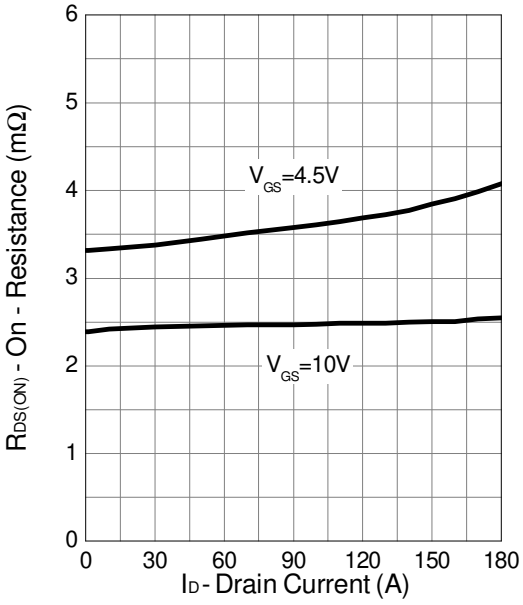
Source-Drain Diode Forward



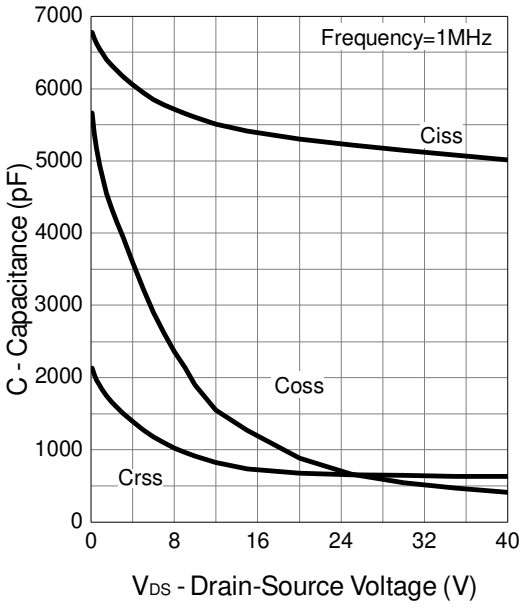
Output Characteristics



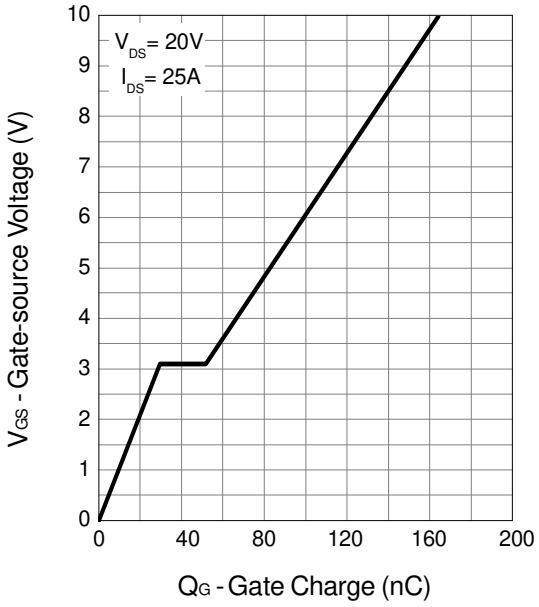
Drain-Source On Resistance

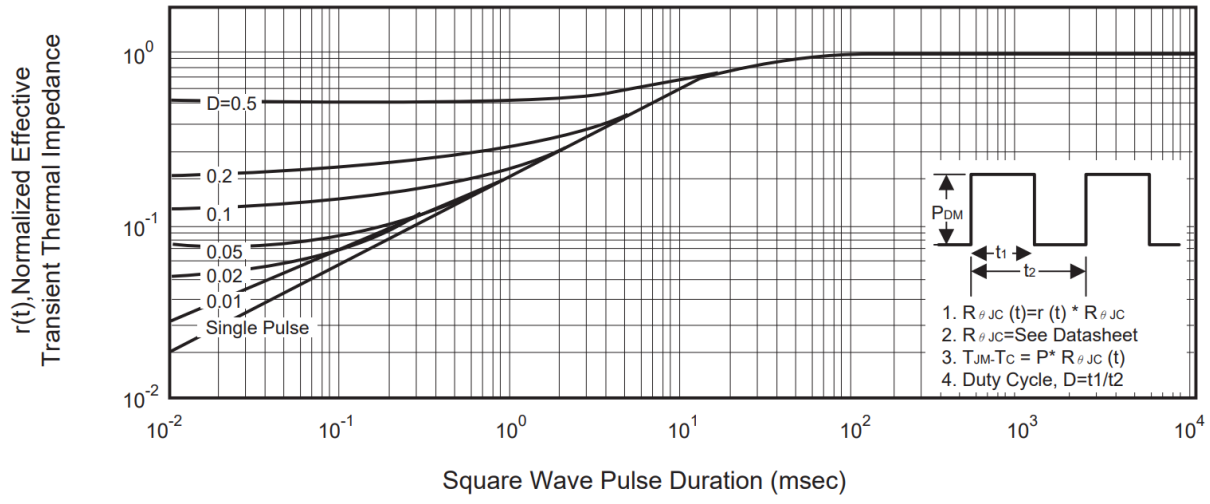


Capacitance

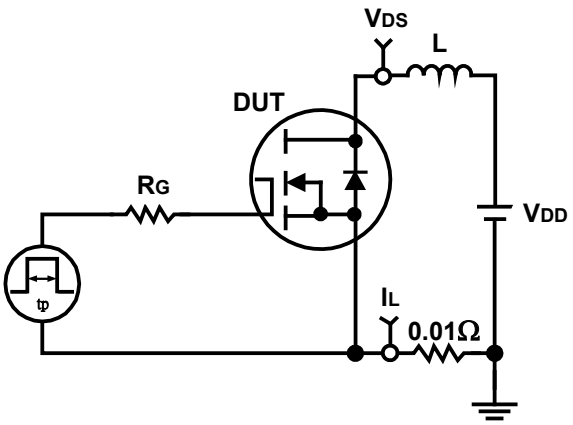


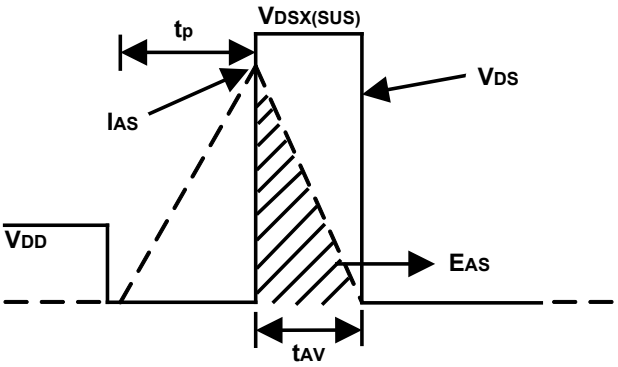
Gate Charge



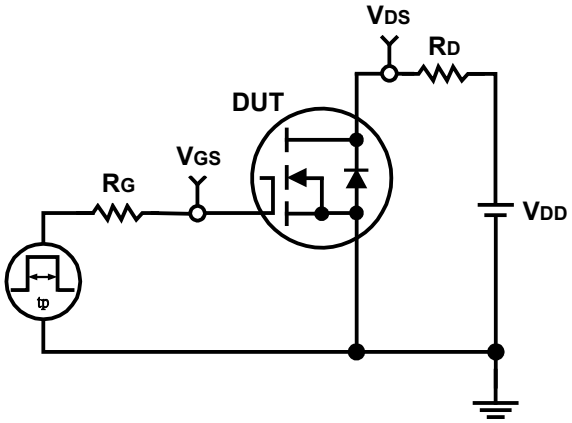


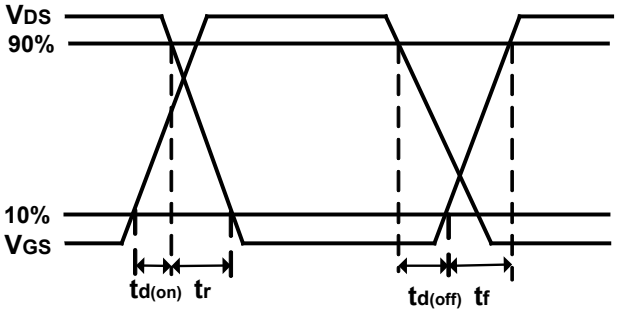
Avalanche Test Circuit and Waveforms



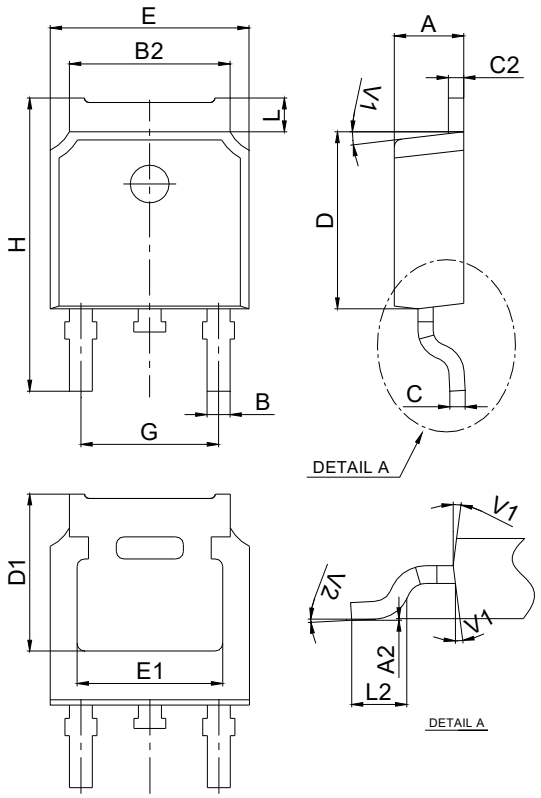


Switching Time Test Circuit and Waveforms





Package Outline Dimensions (TO-252)



Symbol	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°