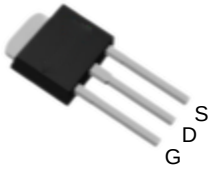
Features

- 100V/40A,
  $R_{DS(ON)}$= 17mΩ (typ.) @ V_{GS}=10V
  $R_{DS(ON)}$= 23mΩ (typ.) @ V_{GS}=4.5V
- Reliable and Rugged
- Lead Free and Green Devices Available
  (RoHS Compliant)

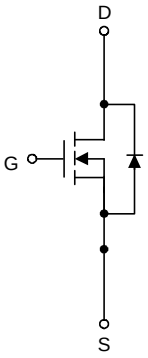
Applications

- Power Management in DC/DC Converter.

Pin Description



Top View of TO-251



N-Channel MOSFET

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (T_A=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		100	V
V_{GSS}	Gate-Source Voltage		±20	
T_J	Maximum Junction Temperature		150	°C
T_{STG}	Storage Temperature Range		-55 to 150	
I_S	Diode Continuous Forward Current	T_C=25°C	40	A
I_D	Continuous Drain Current	T_C=25°C	40	A
		T_C=100°C	16	
I_{DM} [a]	Pulsed Drain Current	T_C=25°C	120	
P_D	Maximum Power Dissipation	T_C=25°C	83	W
		T_C=100°C	33	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		1.5	°C/W
I_D	Continuous Drain Current	T_A=25°C	6.7	A
		T_A=70°C	5.3	
P_D	Maximum Power Dissipation	T_A=25°C	2.5	W
		T_A=70°C	1.6	
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		50	°C/W
I_{AS} [b]	Avalanche Current, Single pulse (L=0.5mH)		18	A
E_{AS} [b]	Avalanche Energy, Single pulse (L=0.5mH)		81	mJ

Note a: Pulse width is limited by max. junction temperature.
b: UIS tested and pulse width are limited by maximum junction temperature 150°C (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	100	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=80V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	30	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	1	2	3	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$ [c]	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=20A	-	17	20	mΩ
		V_{GS}=4.5V, I_{DS}=15A	-	23	27	mΩ

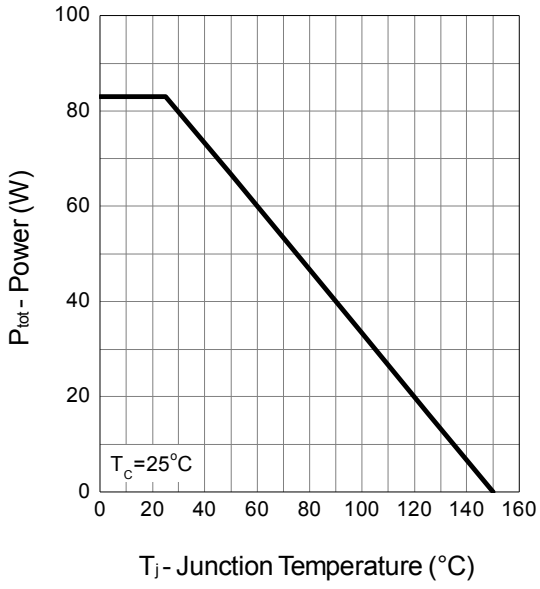
Electrical Characteristics (Cont.) (T_A = 25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Diode Characteristics						
V_{SD} [c]	Diode Forward Voltage	I_{SD}=20A, V_{GS}=0V	-	0.8	1.3	V
t_{rr}	Reverse Recovery Time	I_{SD}=20A, dI_{SD}/dt=100A/μs	-	40	-	ns
Q_{rr}	Reverse Recovery Charge		-	83	-	nC
Dynamic Characteristics [d]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,f=1MHz	-	1.0	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=30V, Frequency=1.0MHz	-	1440	-	pF
C_{oss}	Output Capacitance		-	405	-	
C_{rss}	Reverse Transfer Capacitance		-	30	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=30V, R_L=30Ω, I_{DS}=1A, V_{GEN}=10V, R_G=6Ω	-	18	33	ns
t_r	Turn-on Rise Time		-	9	17	
$t_{d(OFF)}$	Turn-off Delay Time		-	56	101	
t_f	Turn-off Fall Time		-	14	26	
Gate Charge Characteristics [d]						
Q_g	Total Gate Charge	V_{DS}=30V, V_{GS}=4.5V, I_{DS}=20A	-	24	-	nC
Q_g	Total Gate Charge	V_{DS}=30V, V_{GS}=10V, I_{DS}=20A	-	50	65	
Q_{gs}	Gate-Source Charge		-	8	-	
Q_{gd}	Gate-Drain Charge		-	10	-	

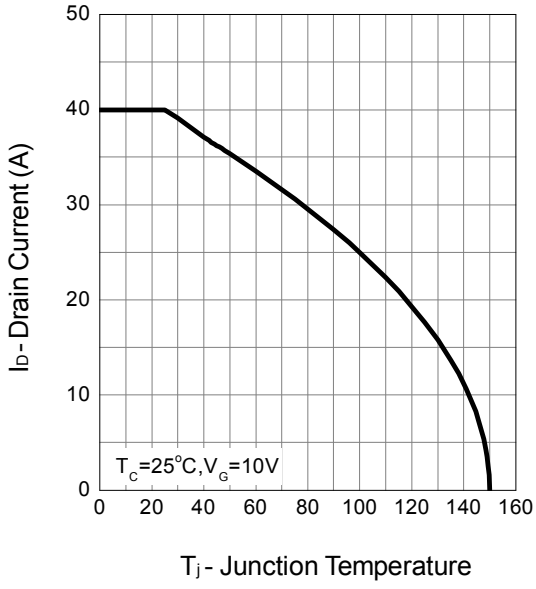
Note c: Pulse test; pulse width≤300μs, duty cycle≤2%.
d: Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

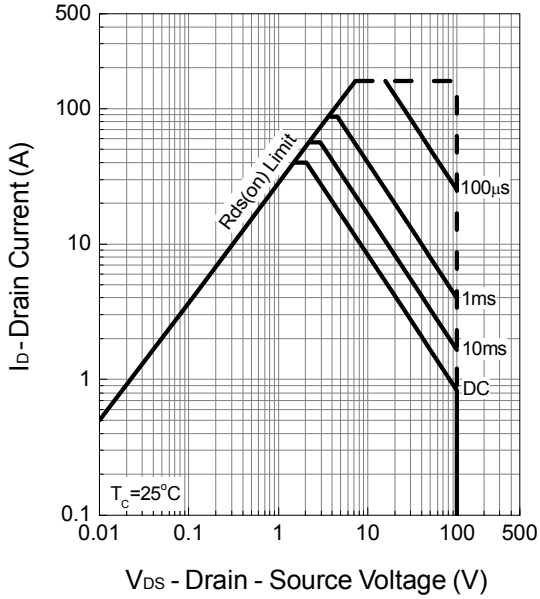
Power Dissipation



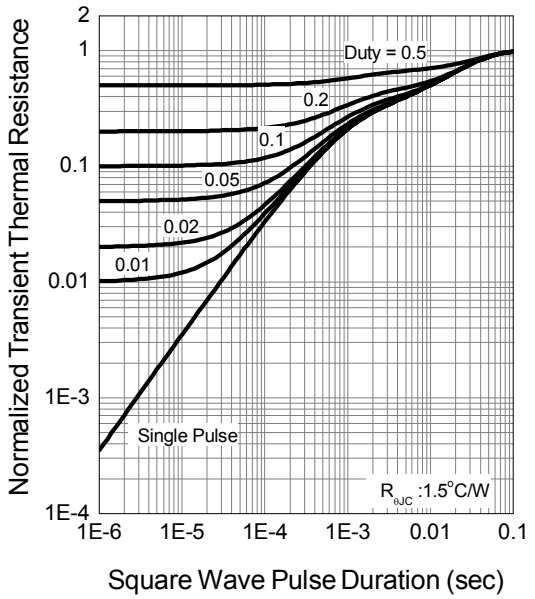
Drain Current



Safe Operation Area

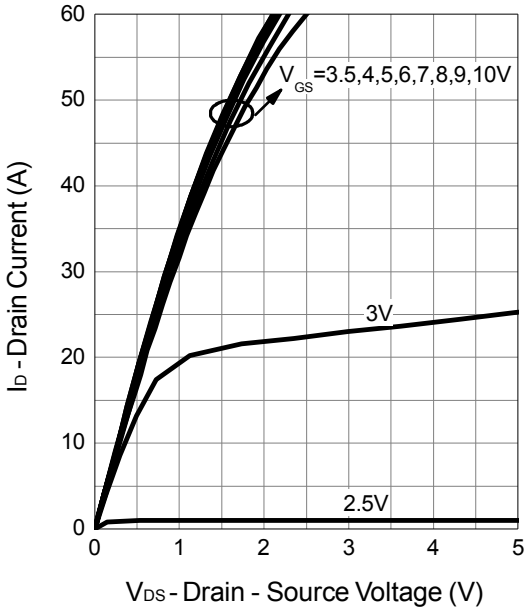


Thermal Transient Impedance

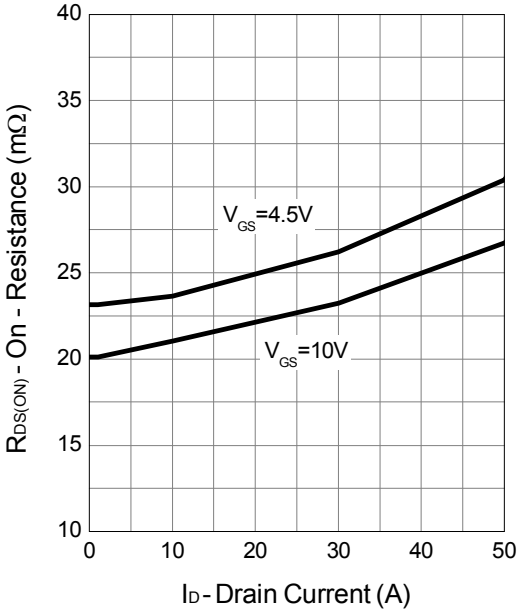


Typical Operating Characteristics (Cont.)

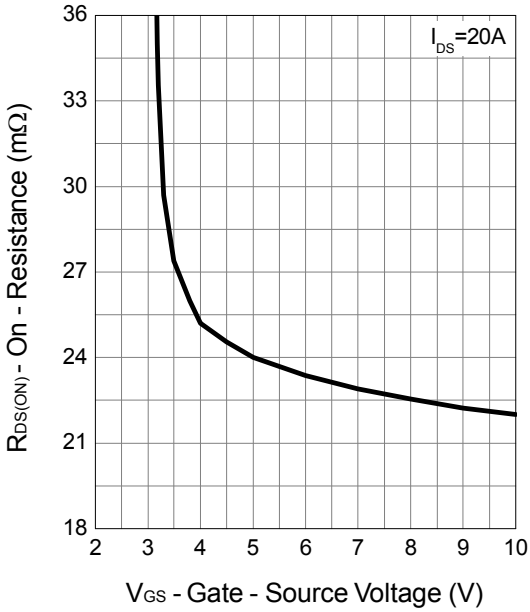
Output Characteristics



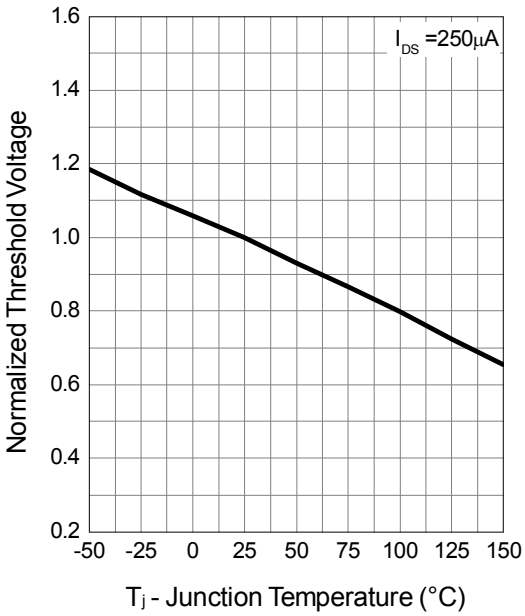
Drain-Source On Resistance



Gate-Source On Resistance

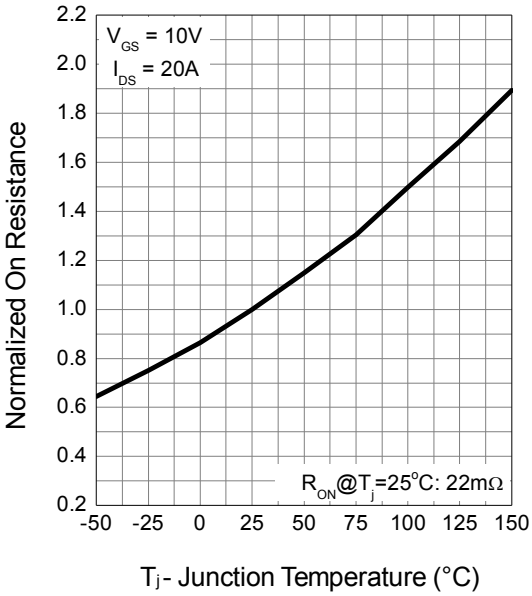


Gate Threshold Voltage

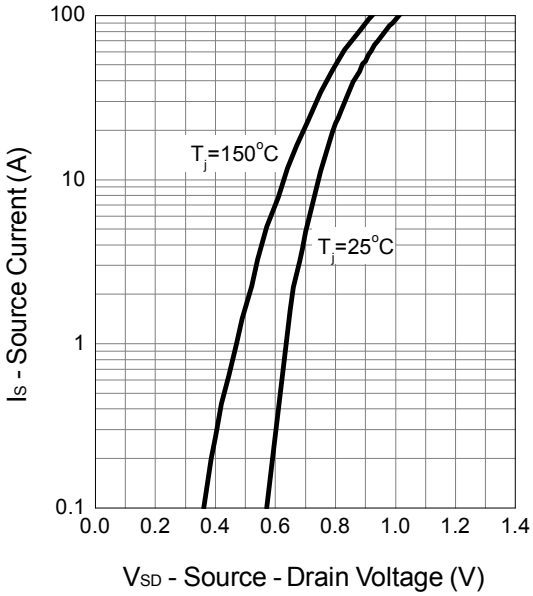


Typical Operating Characteristics (Cont.)

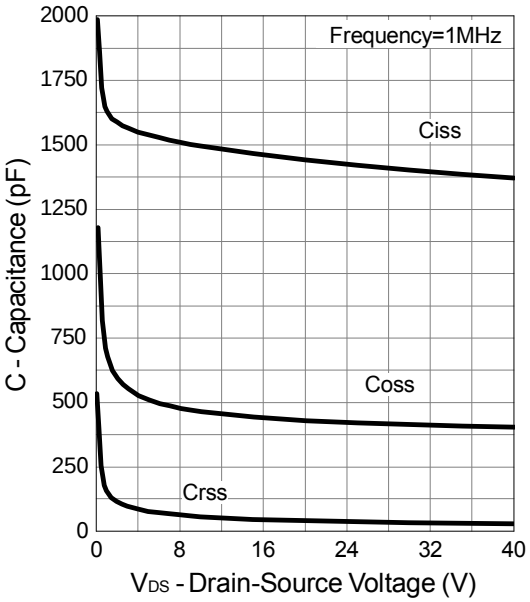
Drain-Source On Resistance



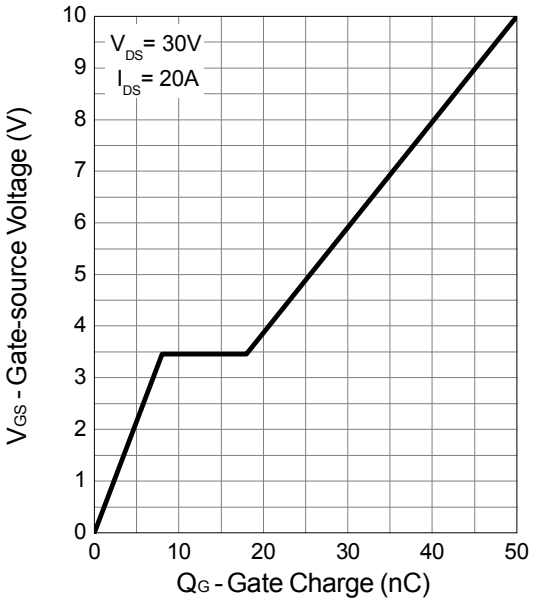
Source-Drain Diode Forward



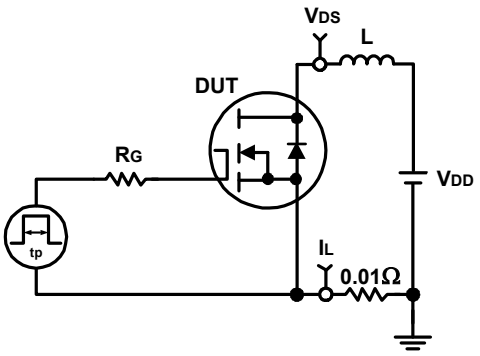
Capacitance

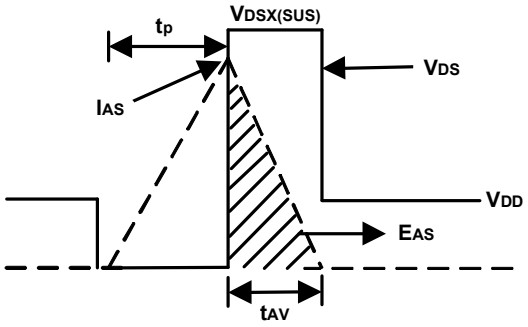


Gate Charge

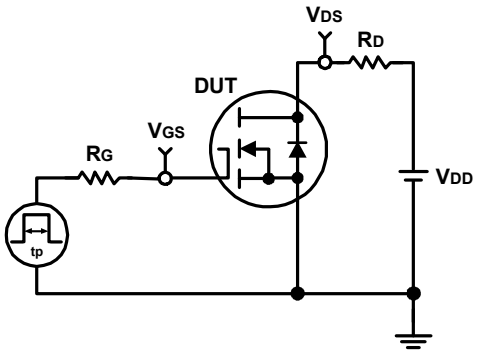


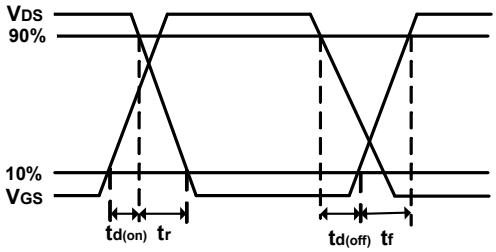
Avalanche Test Circuit and Waveforms



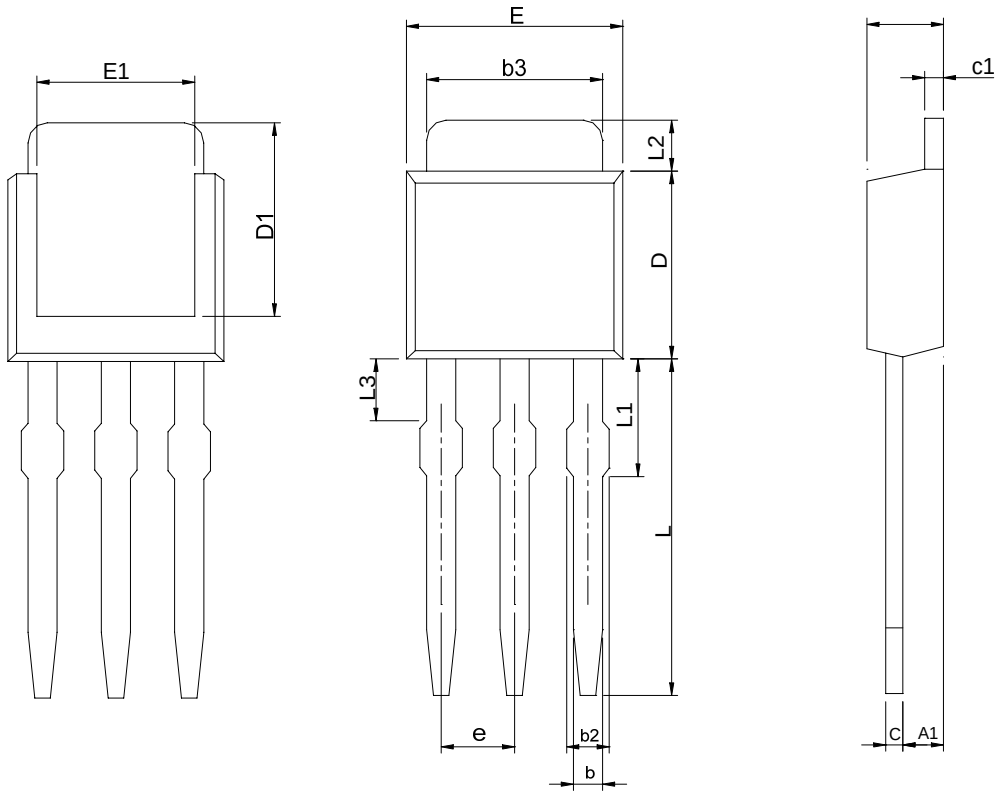


Switching Time Test Circuit and Waveforms



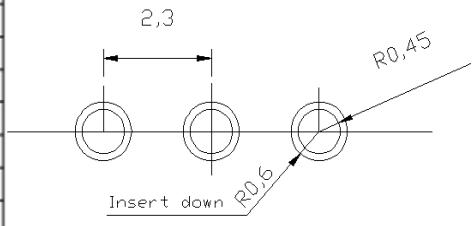


Package Information



SYMBOL	TO-251			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	2.184	2.388	0.086	0.094
A1	0.890	1.143	0.035	0.045
b	0.635	0.890	0.025	0.035
b2	0.910	1.143	0.036	0.045
b3	4.953	5.460	0.195	0.215
c	0.457	0.610	0.018	0.024
c1	0.457	0.890	0.018	0.035
D	5.334	6.223	0.210	0.245
D1	5.207	-	0.205	-
E	6.350	6.730	0.250	0.265
E1	4.320	-	0.170	-
e	2.29 BSC		0.090 BSC	
L	7.000	9.650	0.280	0.380
L1	1.905	2.290	0.075	0.090
L2	0.890	1.270	0.035	0.050
L3	1.143	1.520	0.045	0.060

RECOMMENDED LAND PATTERN



UNIT: mm