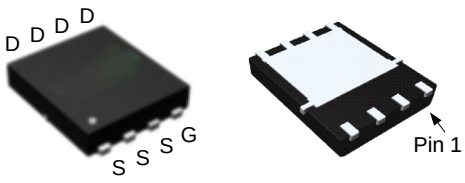
Features

- 40V/200A,
  $R_{DS(ON)}$= 1 mΩ (typ.) @ V_{GS}=10V
  $R_{DS(ON)}$= 1 . 5 mΩ (typ.) @ V_{GS}=4.5V
- 100% UIS + R_g Tested
- Reliable and Rugged
- Lower $R_{DS(ON)}$ to Minimize Conduction Losses
- Lead Free and Green Devices Available (RoHS Compliant)

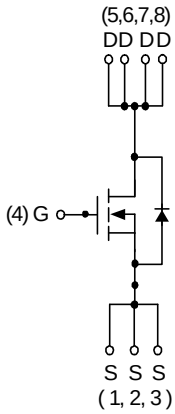
Applications

- SMPS Synchronous Rectification
- Load Switch
- DC-DC Conversion
- Or-ing

Pin Description



DFN5x6-8



N-Channel MOSFET

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 [a]	Diode Continuous Forward Current	T_C=25°C	90	A
I_D [a]	Continuous Drain Current	T_C=25°C	200	
		T_C=100°C	200	
I_{DM} [b]	Pulsed Drain Current	T_C=25°C	400	
P_D	Maximum Power Dissipation	T_C=25°C	375	W
		T_C=100°C	187	
$R_{\theta JC}$	Thermal Resistance-Junction to Case	Steady State	0.85	°C/W
I_S [c]	Diode Continuous Forward Current	T_A=25°C	2.2	A
I_D [c]	Continuous Drain Current	T_A=25°C	29	A
		T_A=70°C	24.3	
I_{DM} [b]	Pulsed Drain Current	T_A=25°C	116	A
P_D [c]	Maximum Power Dissipation	T_A=25°C	3	W
		T_A=70°C	2.1	
$R_{\theta JA}$ [c]	Thermal Resistance-Junction to Ambient		50	°C/W
I_{AS} [d]	Avalanche Current, Single pulse	L=0.5mH	45	A
E_{AS} [d]	Avalanche Energy, Single pulse	L=0.5mH	105	mJ

Note a : Maximum continue current is limited by bonding wire.
Note b : Pulse width is limited by maximum junction temperature 175°C.
Note c : $R_{\theta JA}$ steady state t=999s.
Note d : UIS tested and pulse width limited by maximum junction temperature 175°C (Initial temperature Tj=25°C).

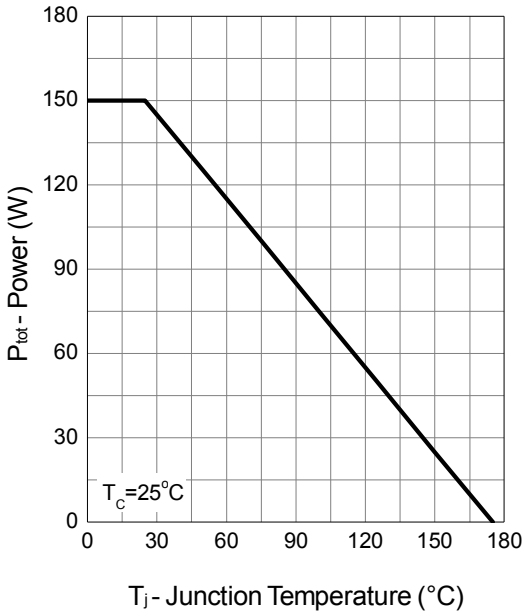
Electrical Characteristics (T_A = 25°C unless otherwise noted)

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	-	1.8	V
I_{GSS}	Gate Leakage Current	V_{GS}=±20V, V_{DS}=0V		-	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=25A	-	1	1.3	mΩ
		T_J=125°C	-	2.4	-	
		V_{GS}=4.5V, I_{DS}=25A	-	1.5	1.8	
Gfs	Forward Transconductance	V_{DS}=5V, I_{DS}=20A	-	3.5	-	S
Diode Characteristics						
V_{SD} [e]	Diode Forward Voltage	I_{SD}=20A, V_{GS}=0V	-	0.78	1.1	V
t_{rr}	Reverse Recovery Time	I_{SD}=25A, dI_{SD}/dt=100A/μs, V_{dd}=20V	-	61	-	ns
t_a	Charge Time		-	31	-	
t_b	Discharge Time		-	30	-	
Q_{rr}	Reverse Recovery Charge		-	67	-	nC
Dynamic Characteristics [f]						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	0.6	0.9	2	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=20V, Frequency=1.0MHz	-	5790	-	pF
C_{oss}	Output Capacitance		-	2000	-	
C_{rss}	Reverse Transfer Capacitance		-	175	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=20V, R_L=20Ω, I_{DS}=1A, V_{GEN}=10V, R_G=1Ω	-	18.8	-	ns
t_r	Turn-on Rise Time		-	9.8	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	50	-	
t_f	Turn-off Fall Time		-	90.8	-	
Gate Charge Characteristics [f]						
Q_g	Total Gate Charge	V_{DS}=20V, V_{GS}=10V, I_{DS}=25A	-	47	-	nC
Q_{gth}	Threshold Gate Charge		-	15.84	-	
Q_{gs}	Gate-Source Charge		-	24.75	-	
Q_{gd}	Gate-Drain Charge		-	15.63	-	

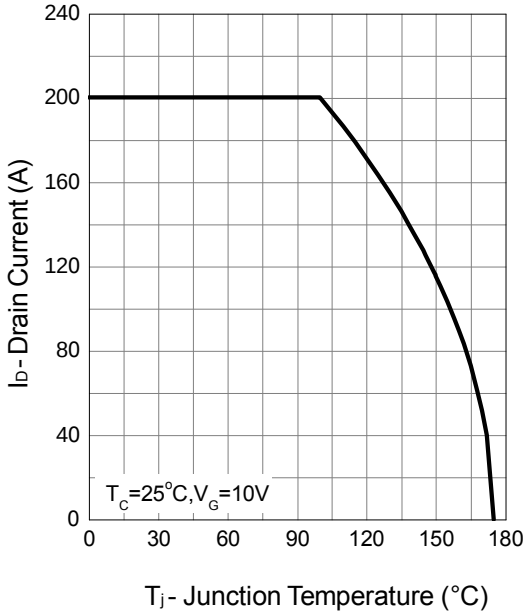
Note e: Pulse test ; pulse width≤300μs, duty cycle≤2%.
Note f Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

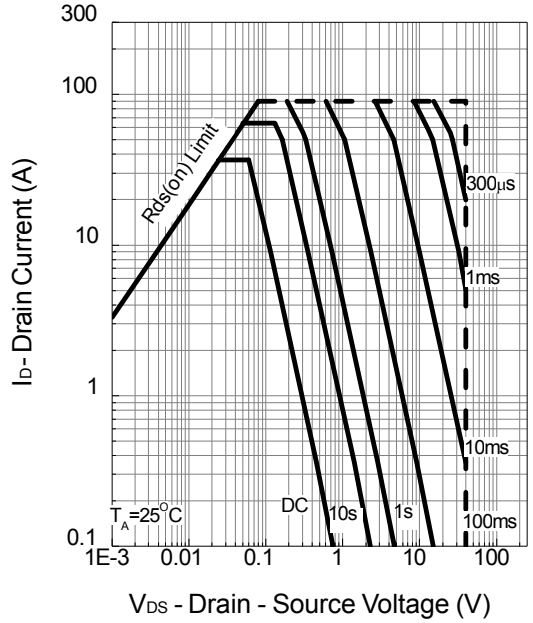
Power Dissipation



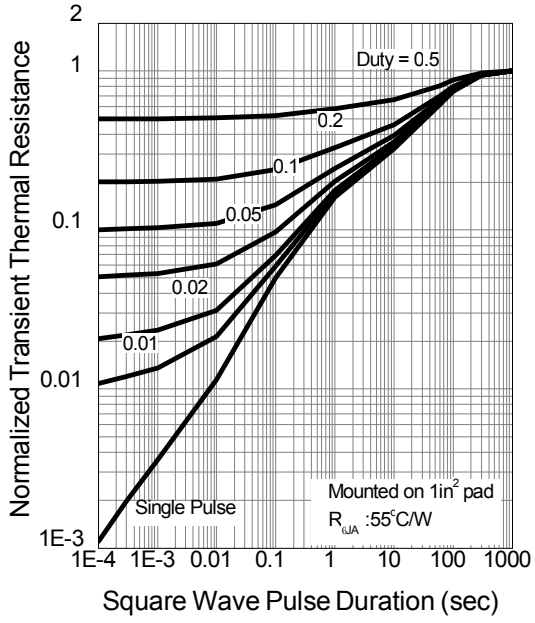
Drain Current



Safe Operation Area

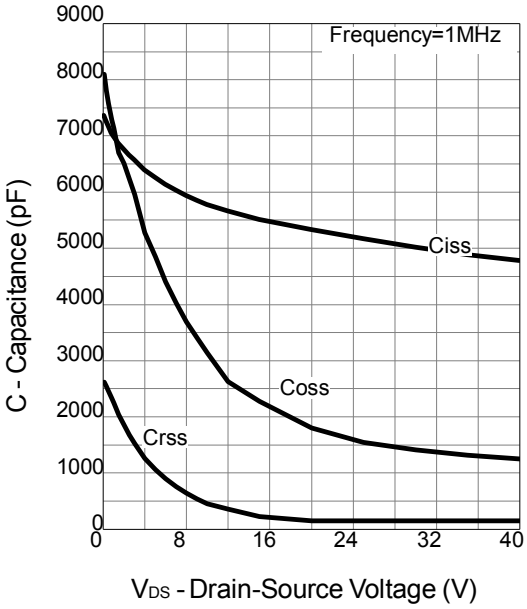


Thermal Transient Impedance

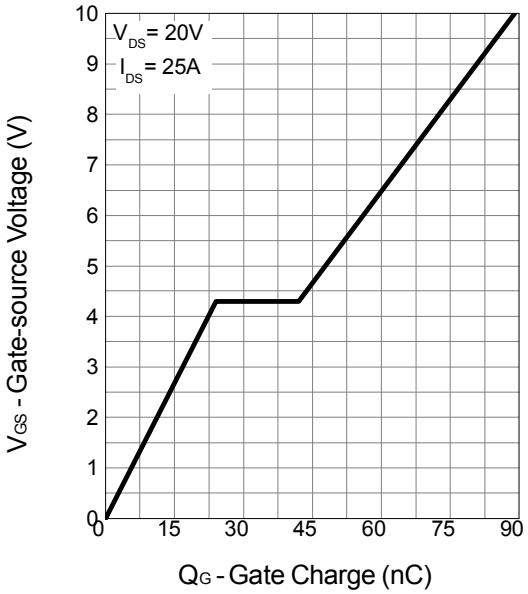


Typical Operating Characteristics (Cont.)

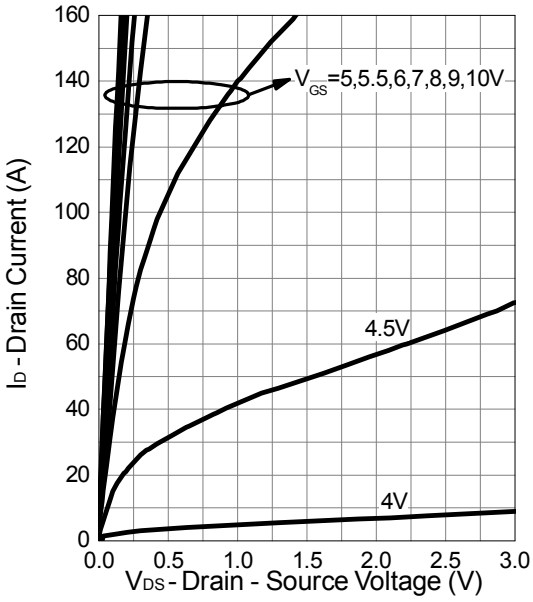
Capacitance



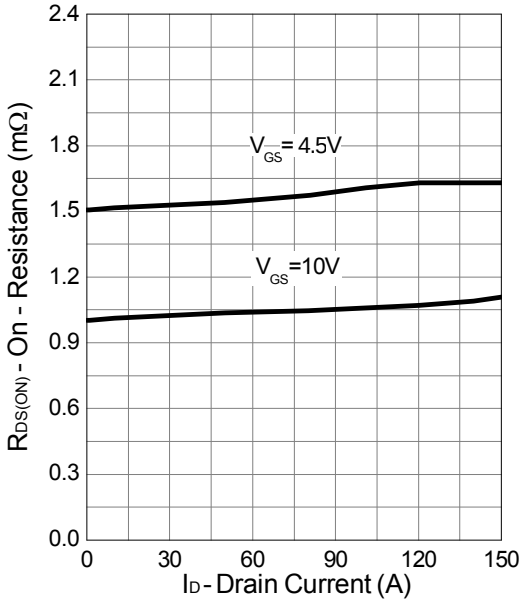
Gate Charge



Output Characteristics

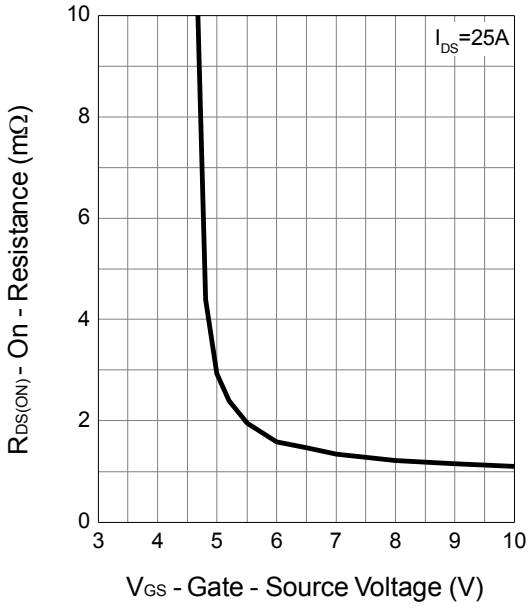


Drain-Source On Resistance

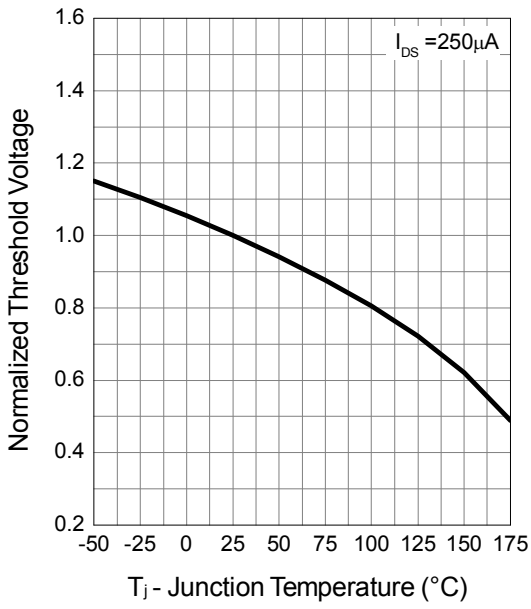


Typical Operating Characteristics (Cont.)

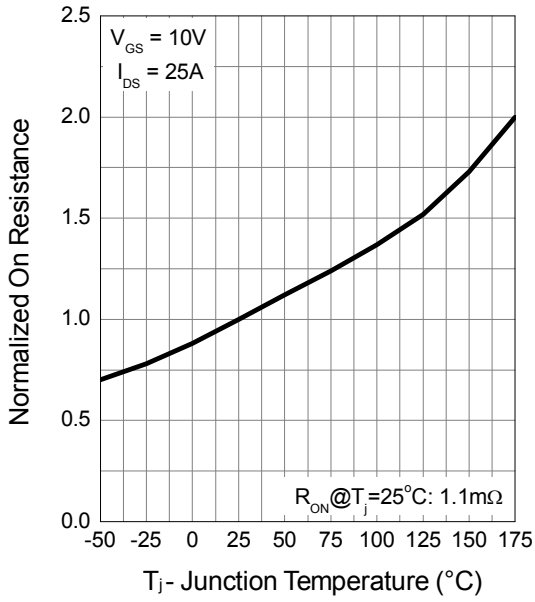
Gate-Source On Resistance



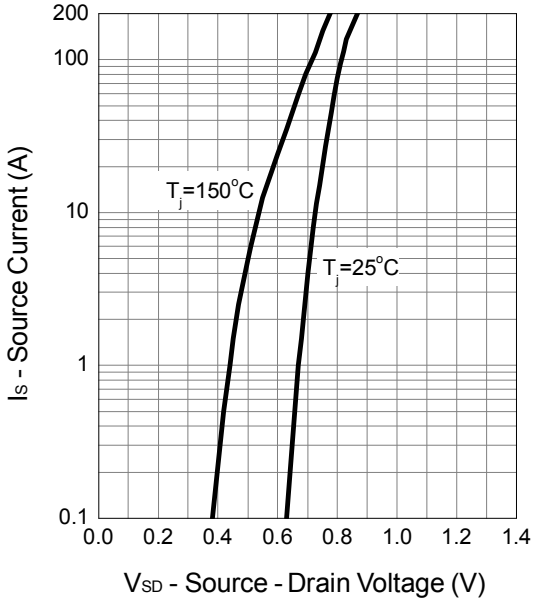
Gate Threshold Voltage



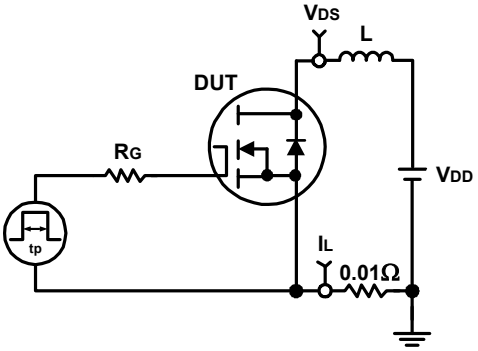
Drain-Source On Resistance

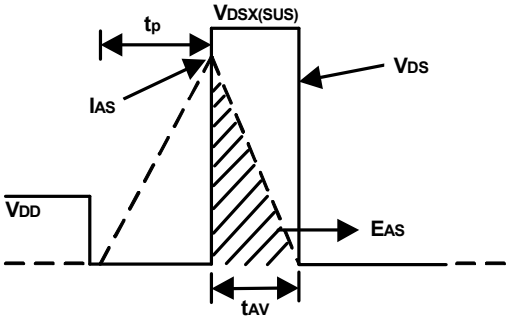


Source-Drain Diode Forward

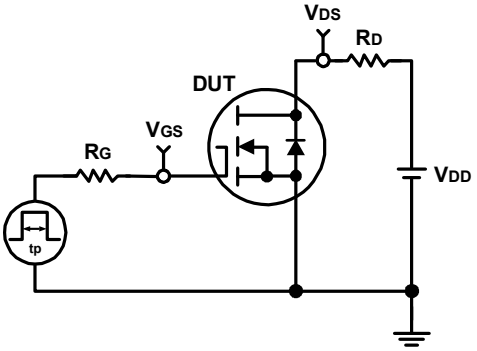


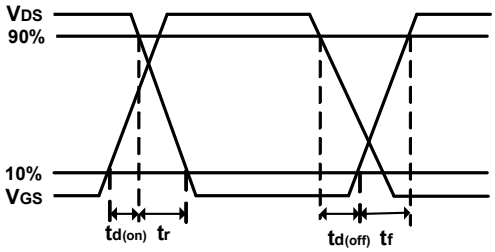
Avalanche Test Circuit and Waveforms





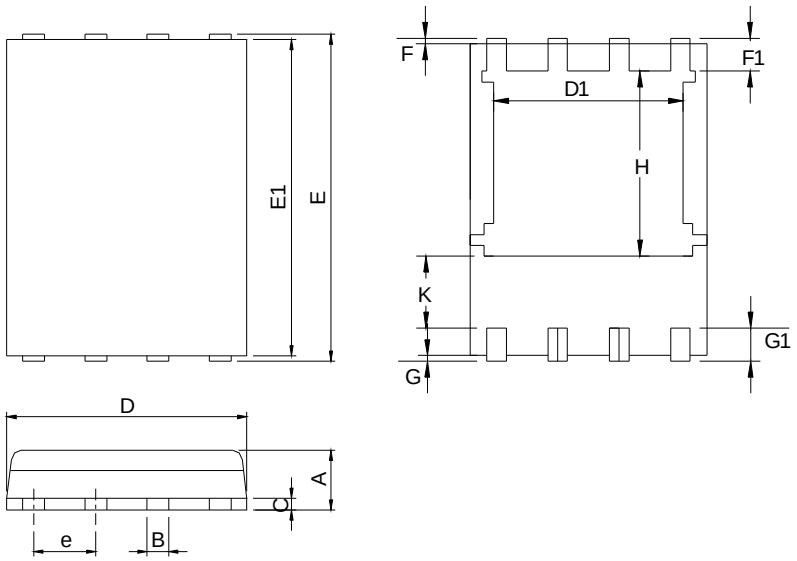
Switching Time Test Circuit and Waveforms





Package Information

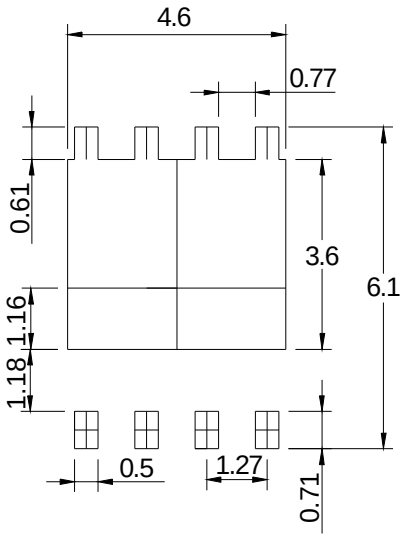
DFN5x6-8



SYMBOL	DFN5x6-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

RECOMMENDED LAND PATTERN



UNIT: mm