N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

BV_{DSS}	40V
$R_{DSON(MAX.)}$	0.0015Ω
I_D	240A

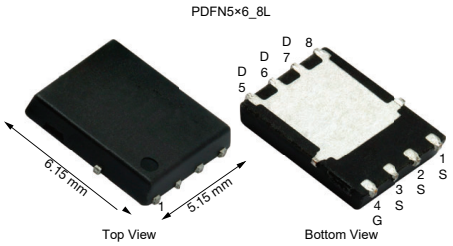
FEATURES

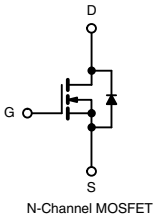
- SGT Power MOSFET
- 175 °C Junction Temperature
- 100 % R_g Tested
- 100 % UIS Tested

RoHS COMPLIANT

APPLICATIONS

- Load Switch
- PWM Application
- Power Management





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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current@10V	T_C = 25 ℃	I_D	240	A
	T_C = 100 ℃		151	
Pulsed Drain Current		I_{DM}	960	A
Single Pulse Avalanche Energy	L = 0.1 mH	E_{AS}	600	mJ
Total Power Dissipation	T_C = 25 ℃	P_D	113.6	W
	T_C = 100 ℃		55	
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to +150	℃

Thermal Characteristics

Parameter	Symbol	TYP.	MAX.	Unit
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	45	52	℃/W
Thermal resistance, junction-to-case	$R_{\theta JC}$	0.9	1.1	

Electrical Characteristics T_J = 25℃, unless otherwise noted

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics							
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0 V , I_D = 250 μA	40	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0 V , V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	T_J = 25℃	I_{DSS}	V_{DS} = 32 V , V_{GS} = 0 V	-	-	1	μA
	T_J = 55℃			-	-	5	
Gate-Threshold Voltage		$V_{GS}(th)$	V_{DS} = V_{GS} , I_D = 250 μA	1		2.5	V
Drain-Source On-Resistance		$R_{DS}(on)$	V_{GS} = 10 V , I_D = 10 A	-	0.0012	0.00156	Ω
			V_{GS} = 4.5 V , I_D = 10 A	-	0.0015	0.00195	
Forward Transconductance		g_{fs}	V_{DS} = 5 V , I_D = 20 A	-	62	-	S
Dynamic Characteristics							
Input Capacitance		C_{iss}	V_{DS} = 20 V , V_{GS} = 0 V , f = 1 MHz	-	8561	-	pF
Output Capacitance		C_{oss}		-	1288	-	
Reverse Transfer Capacitance		C_{rss}		-	1253	-	
Switching Characteristics							
Total Gate Charge		Q_g	V_{GS} = 10 V , V_{DS} = 20 V , I_D = 20 A	-	73	-	nC
Gate-Source Charge		Q_{gs}		-	45	-	
Gate-Drain Charge		Q_{gd}		-	24	-	
Turn-On Delay Time		$t_{d(on)}$	V_{DD} = 20 V , R_L = 1 Ω , V_{GEN} = 10 V , R_G = 6 Ω	-	22	-	nS
Rise Time		t_r		-	39	-	
Turn-Off Delay Time		$t_{d(off)}$		-	62	-	
Fall Time		t_f		-	30	-	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage		V_{SD}	I_S = 1 A , V_{GS} = 0 V	-	0.7	1	V
Continuous Source-Dranin Diode Current		I_S	T_J = 25 °C	-	-	138	A
Reverse Recovery Time		t_{rr}	T_J = 25 °C , I_F = 20 A , dI/dt = 100 A/μs	-	77	-	ns
Reverse Recovery Charge		Q_{rr}		-	69	-	nC

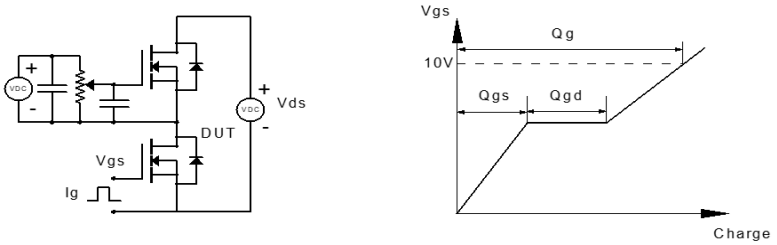
a. Computed continuous current assumes the condition of TJ_Max while the actual continuous current depends on the thermal & electro-mechanical application board design.

b. This single-pulse measurement was taken under TJ_Max = 150°C.

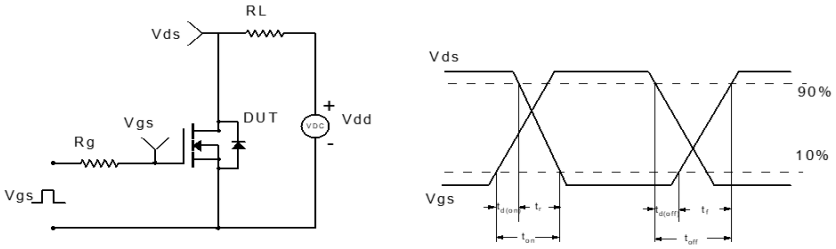
c. EAS of 600mJ is based on starting TJ = 25°C,L = 3.0mH, IAS = 20A, VGS = 10V, VDD = 20V;100% test at L = 0.5mH, IAS = 42A.

d. The power dissipation PD is based on TJ_Max = 150°C.

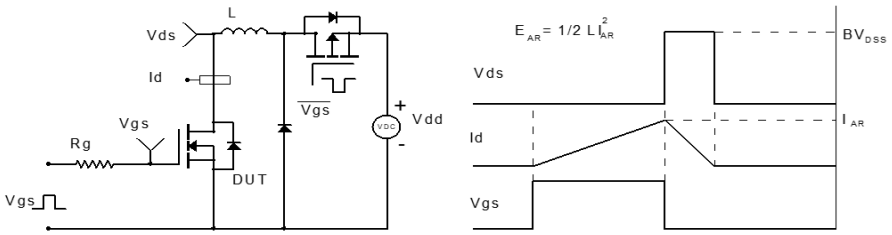
e. This value is guaranteed by design hence it is not included in the production test.



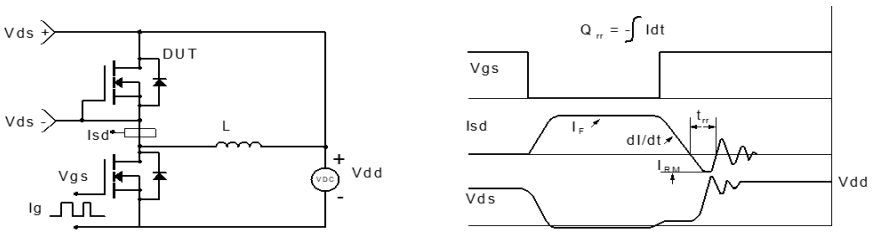
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform

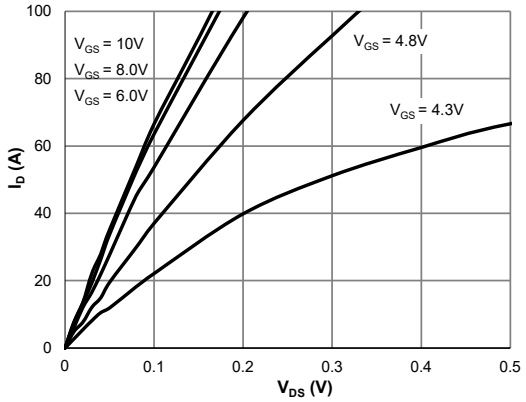


Unclamped Inductive Switching Test Circuit& Waveform

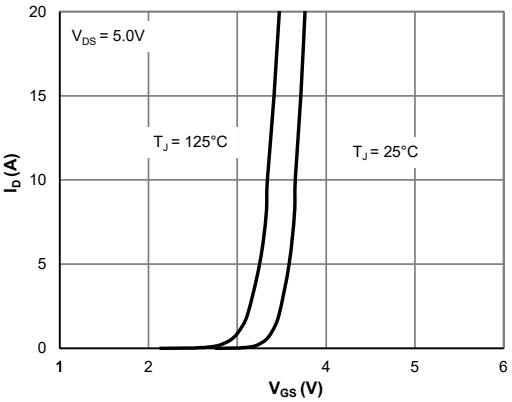


Diode Recovery Test Circuit & Waveform

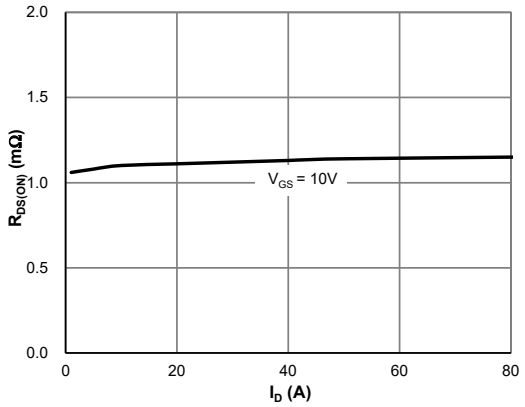
TYPICAL CHARACTERISTICS (25 °C unless noted)



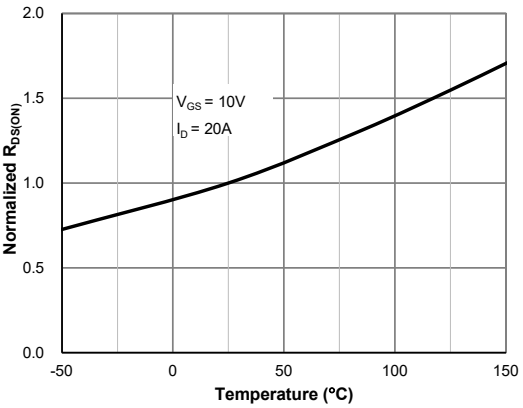
Saturation Characteristics



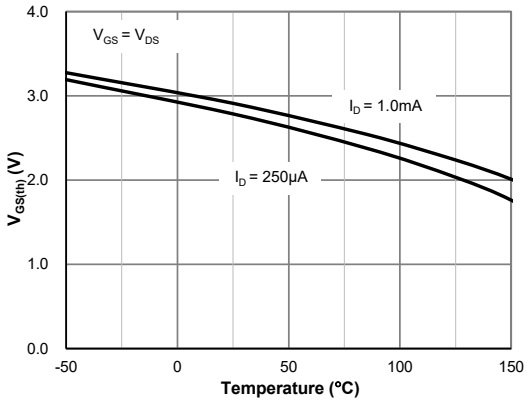
Transfer Characteristics



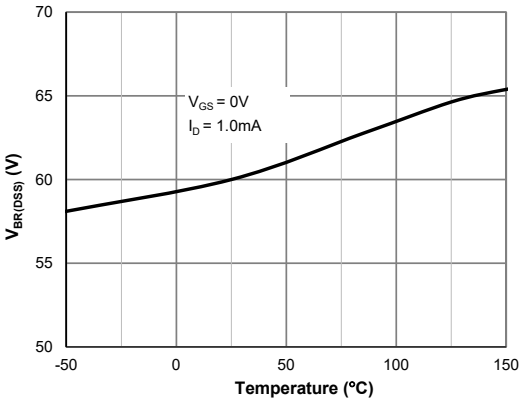
$R_{DS(ON)}$ vs. Drain Current



$R_{DS(ON)}$ vs. Junction Temperature

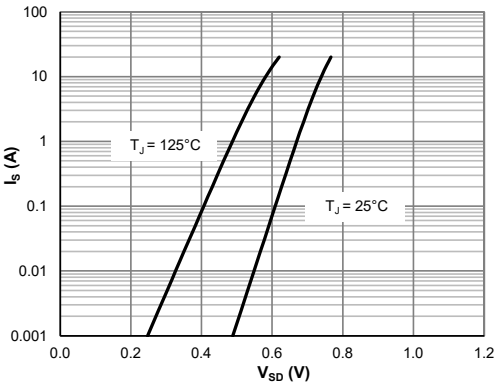


VGS(th) vs. Junction Temperature

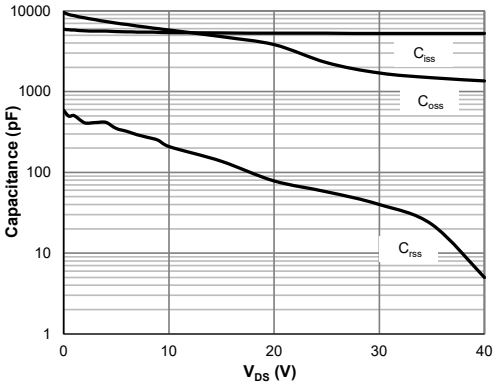


$V_{BR(DSS)}$ vs. Junction Temperature

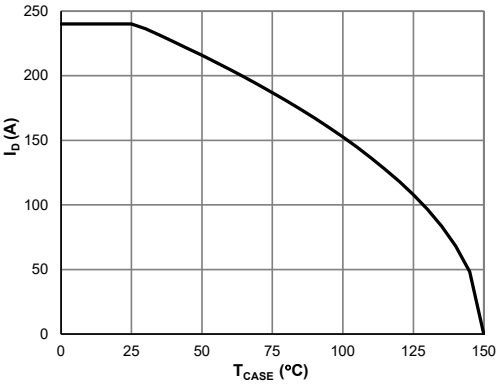
TYPICAL CHARACTERISTICS (25 °C unless noted)



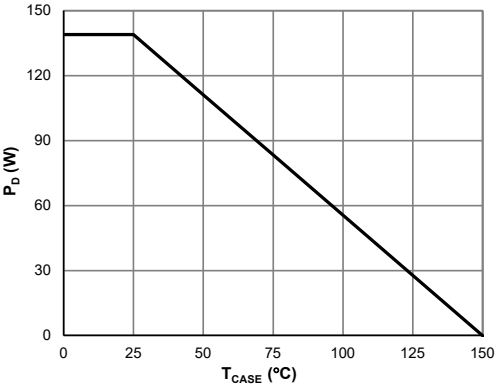
Body-Diode Characteristics



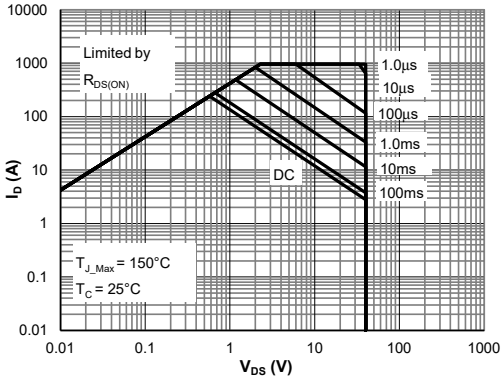
Capacitance Characteristics



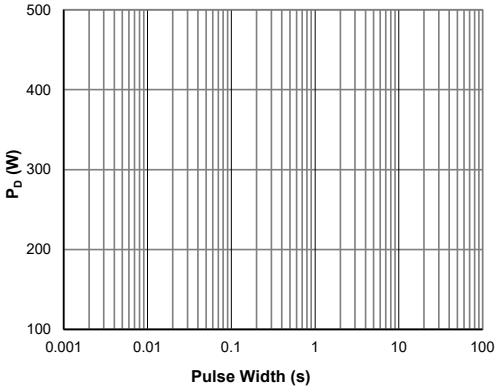
Current De-rating



Power De-rating

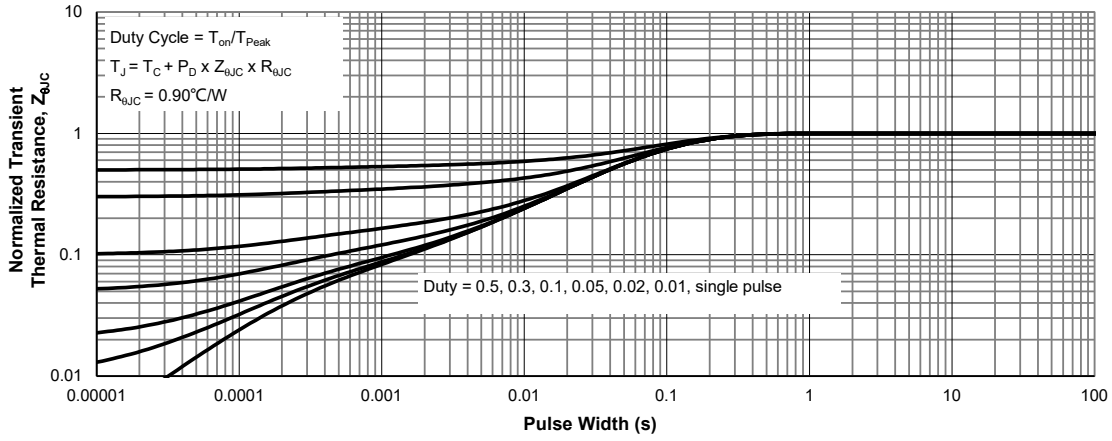


Maximum Safe Operating Area



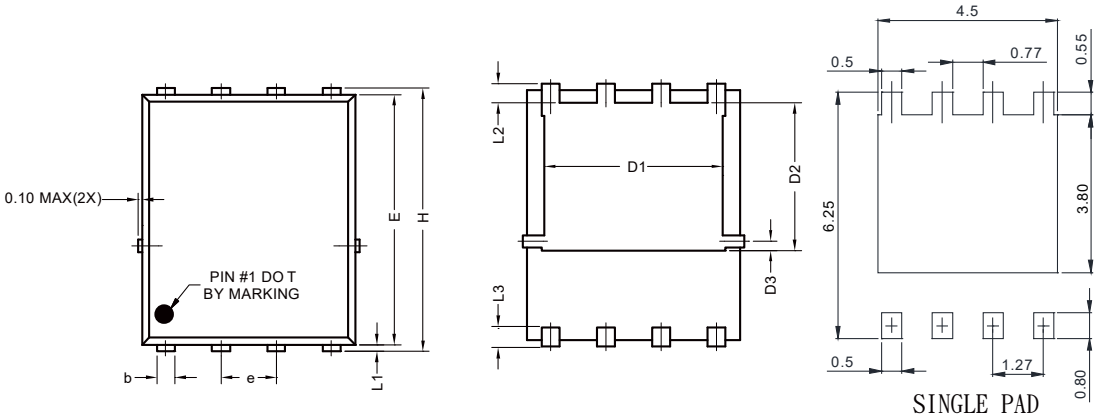
Single Pulse Power Rating, Junction-to-Case

TYPICAL CHARACTERISTICS (25 °C unless noted)



Normalized Maximum Transient Thermal Impedance

PDFN5×6-8L_EP1_P PACKGE OUTLIN



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.800	1.170	0.031	0.046
b	0.340	0.490	0.013	0.019
c	0.20	0.34	0.008	0.013
D	4.800	5.100	0.009	0.011
D1	3.800	4.200	0.150	0.165
D2	3.180	3.78	0.125	0.149
D3	0.150	0.360	0.006	0.142
E	5.650	5.900	0.222	0.232
e	1.270 TYP		0.050 TYP	
H	5.900	6.150	0.232	0.242
L1	0.050	0.250	0.002	0.010
L2	0.380	0.620	0.015	0.024
L3	0.380	0.75	0.015	0.030