N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY

BV_{DSS}	100V
$R_{DSON(MAX.)}$	0.017Ω
I_D	55A

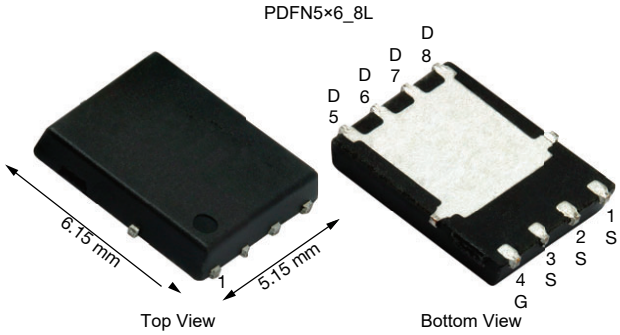
FEATURES

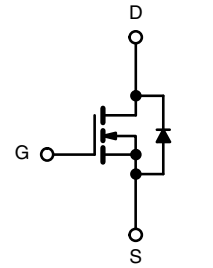
- 150 °C Junction Temperature
- SGT Technology Power MOSFET
- Material categorization

RoHS COMPLIANT

APPLICATIONS

- DC-DC Converters
- Power management
- Synchronous-rectification applications





N-Channel MOSFET

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

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current@10V	T_C = 25 °C	I_D	55	A
	T_C = 100 °C		29	
Pulsed Drain Current		I_{DM}	184	A
Single Pulse Avalanche Energy	L = 0.1 mH	E_{AS}	80	mJ
Avalanche Current		I_{AS}	70	A
Total Power Dissipation	T_C = 25 °C	P_D	71.4	W
Operating Junction and Storage Temperature Range		T_J , T_{STG}	-55 to +150	°C

Thermal Characteristics

Parameter	Symbol	TYP.	MAX.	Unit
Thermal resistance, junction-to-ambient	$R_{\theta JA}$	-	52	°C / W
Thermal resistance, junction-to-case	$R_{\theta JC}$	-	1.75	

Electrical Characteristics T_J = 25°C, 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	100	-	-	V
Gate-body Leakage current	I_{GSS}	V_{DS} = 0 V , V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100 V , V_{GS} = 0 V , T_J = 25 °C	-	-	1	μA
		V_{DS} = 100 V , V_{GS} = 0 V , T_J = 100 °C	-	-	100	
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 = 20 A	-	0.013	0.017	Ω
		V_{GS} = 4.5 V , I_D = 15 A	-	0.0165	0.021	
Forward Transconductance	g_{fs}	V_{DS} = 10 V , I_D = 20 A	-	54	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS} = 50 V , V_{GS} = 0 V , f = 1 MHz	-	1210	-	pF
Output Capacitance	C_{oss}		-	146	-	
Reverse Transfer Capacitance	C_{rss}		-	11.5	-	
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS} = 50 V , V_{GS} = 10 V , I_D = 20 A	-	22.9	-	nC
Gate-Source Charge	Q_{gs}		-	5	-	
Gate-Drain Charge	Q_{gd}		-	7	-	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 50 V , I_D ≅ 20 A , V_{GEN} = 10 V , R_G = 3 Ω	-	9.4	-	nS
Rise Time	t_r		-	3.8	-	
Turn-Off Delay Time	$t_{d(off)}$		-	25.8	-	
Fall Time	t_f		-	4.6	-	
Drain-Source Body Diode Characteristics						
Diode Forward Voltage	V_{SD}	I_S = 20 A , V_{GS} = 0 V	-	-	1.2	V
Continuous Source-Dranin Diode Current	I_S	T_J = 25 °C	-	-	55	A
Continuous Source Current	I_{SM}		-	-	175	A
Reverse Recovery Charge	Q_{rr}	T_J = 25 °C , I_F = 20 A , dI/dt = 100 A/μs	-	32	-	nC
Reverse Recovery Time	t_{rr}		-	44	-	ns

Notes:

a. epetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C

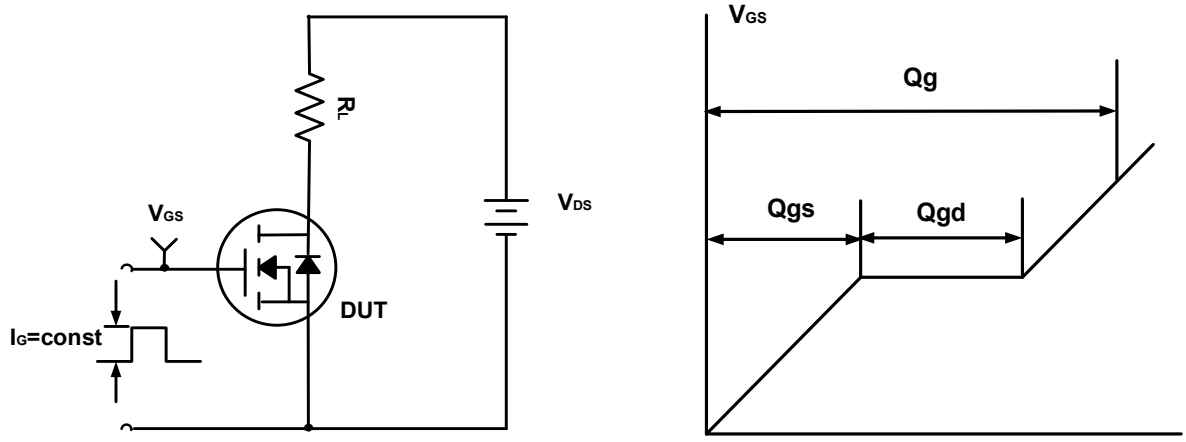
b. The E_{AS} data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1Mh,I_{AS}=40A.

c. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.

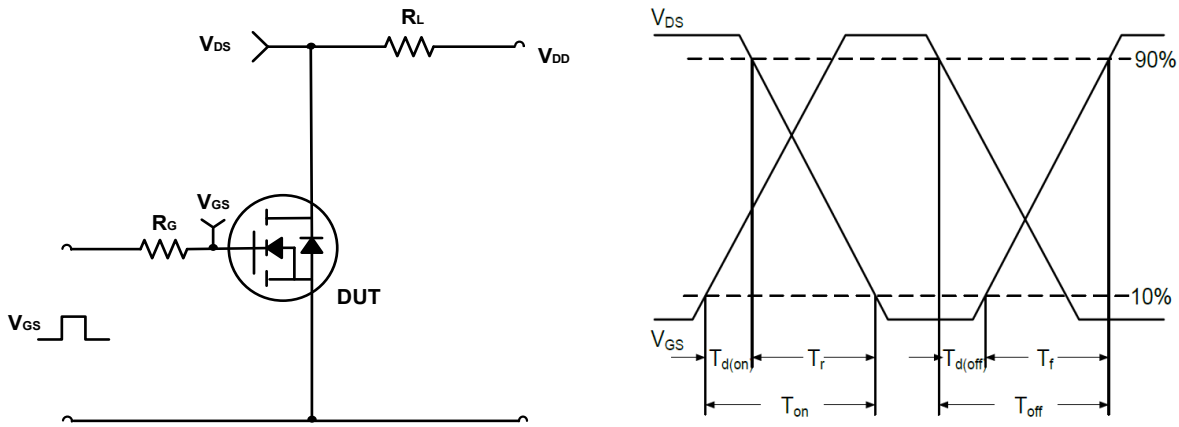
d. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.

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

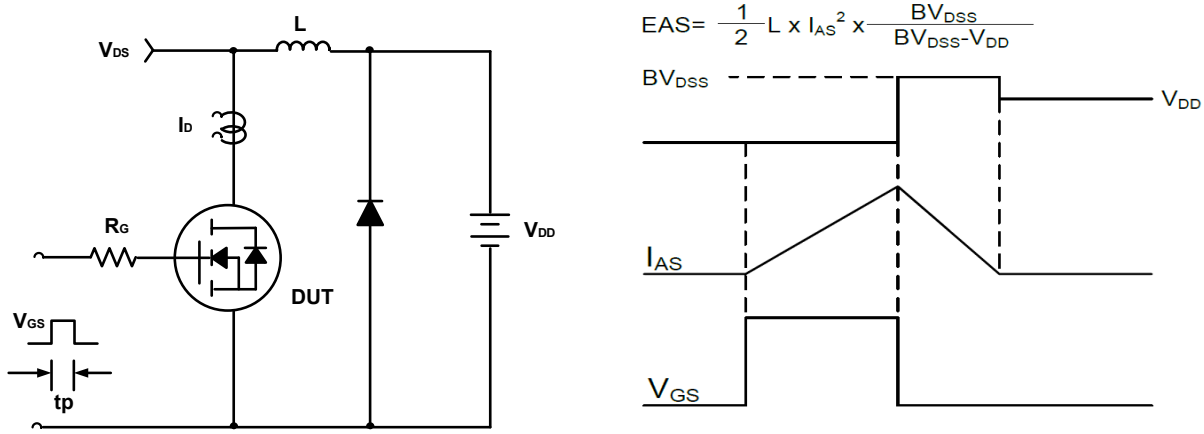
Test circuit and Waveform



Gate Charge Test Circuit & Waveforms

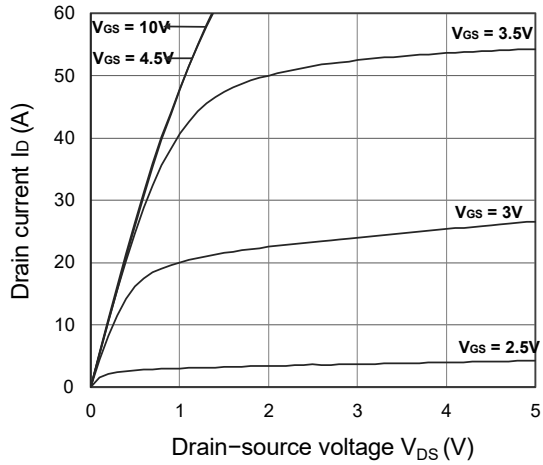


Switching Test Circuit & Waveforms

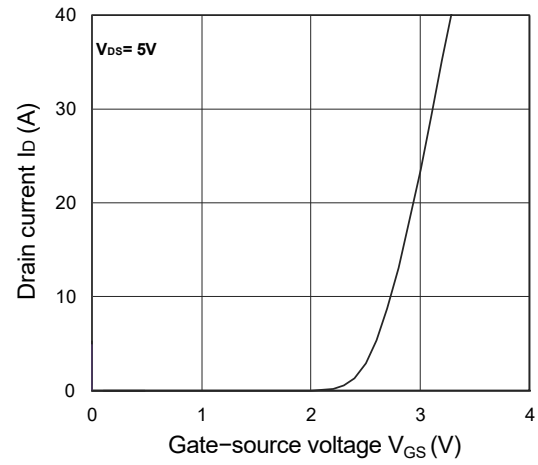


Unclamped Inductive Switching Circuit & Waveforms

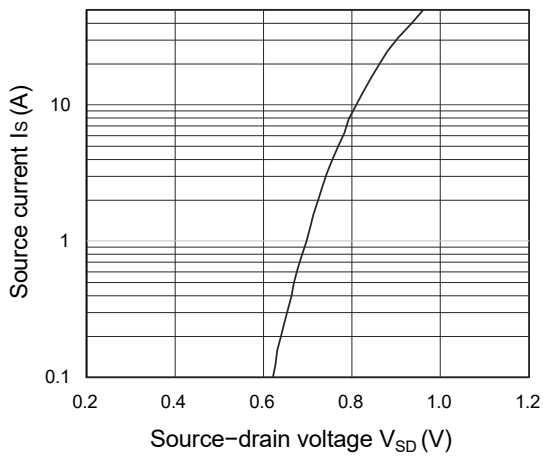
TYPICAL CHARACTERISTICS (25 °C unless noted)



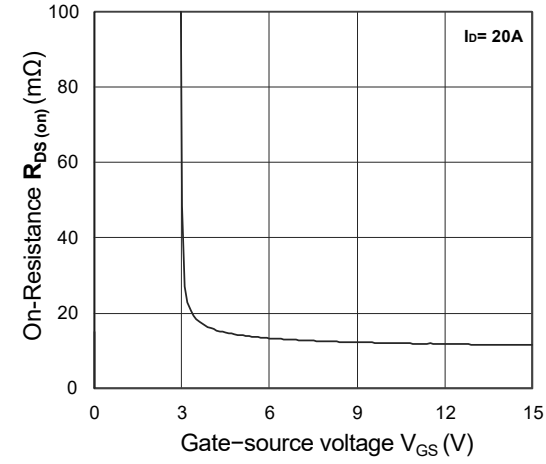
Output Characteristics



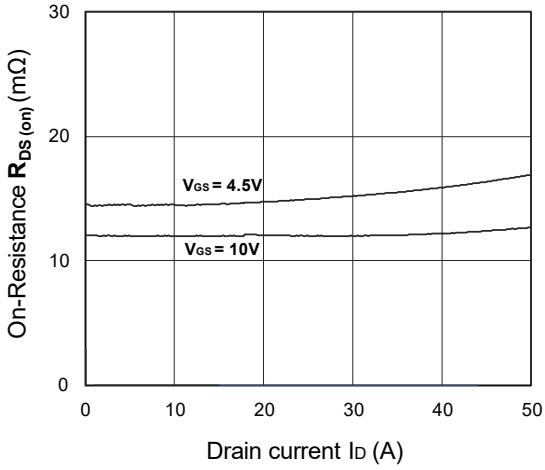
Transfer Characteristics



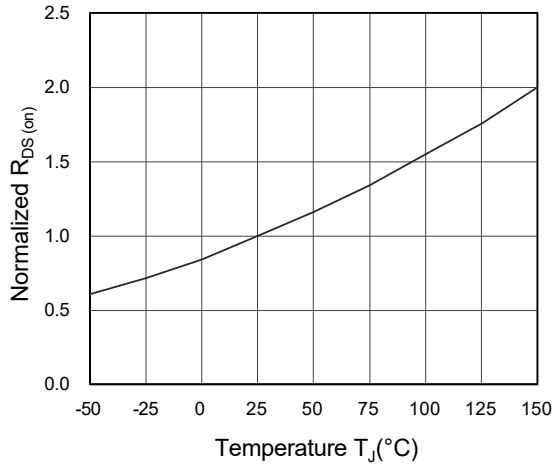
Forward Characteristics of Reverse



$R_{DS(ON)}$ vs. V_{GS}

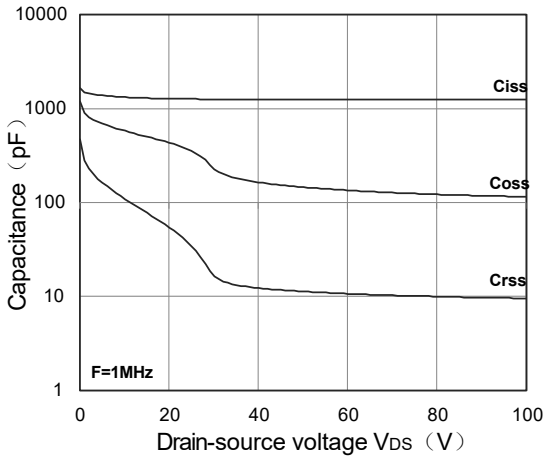


$R_{DS(ON)}$ vs. I_D

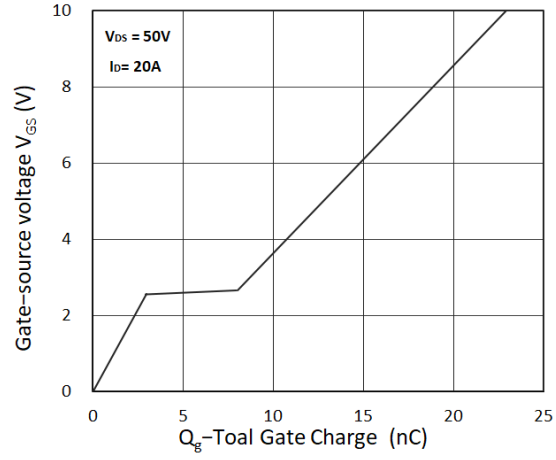


Normalized $R_{DS(on)}$ vs. Temperature

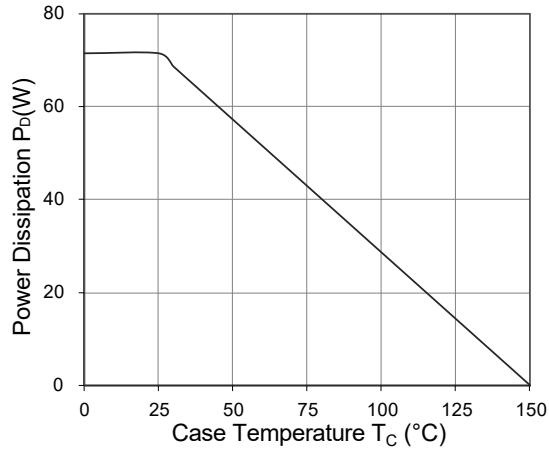
TYPICAL CHARACTERISTICS (25 °C unless noted)



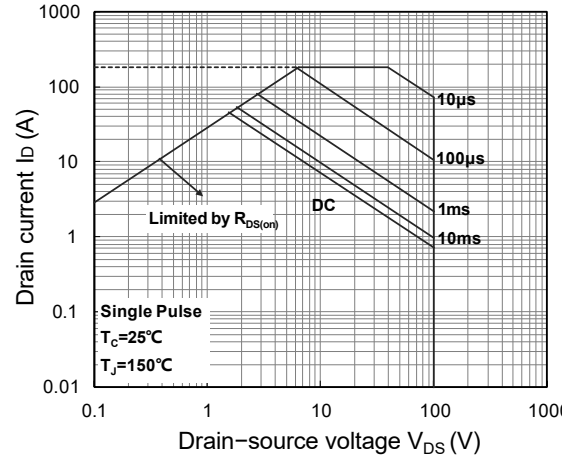
Capacitance Characteristics



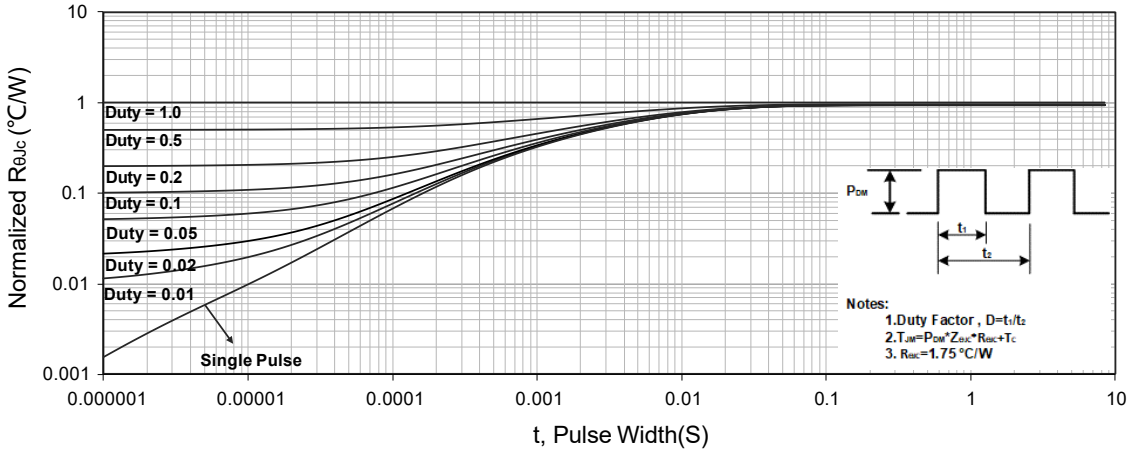
Gate Charge Characteristics



Power Dissipation

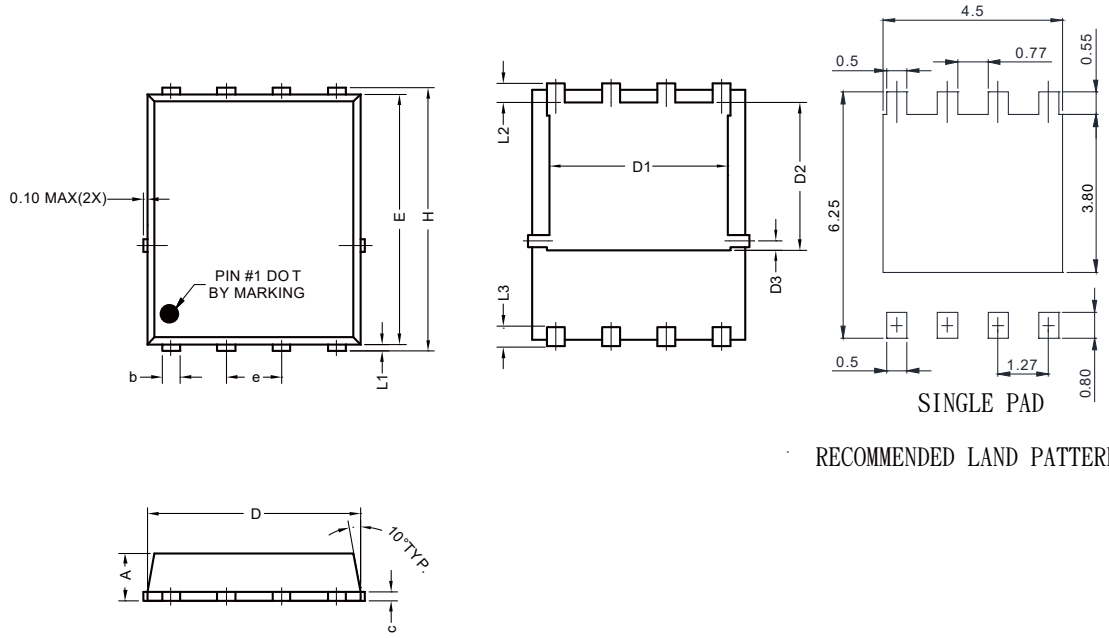


Safe Operating Area



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