

N-Channel 100 V (D-S) MOSFET

PRODUCT SUMMARY

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

FEATURES

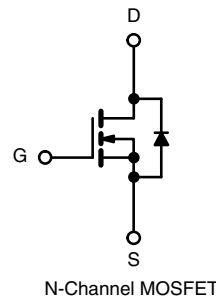
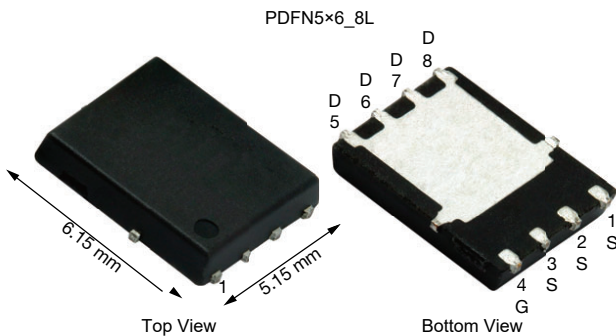
- 150 °C Junction Temperature
- SGT Technology Power MOSFET
- Material categorization



RoHS
COMPLIANT

APPLICATIONS

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



Absolute Maximum Ratings ($T_A = 25\text{ }^\circ\text{C}$, 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	I_D	$T_C = 25\text{ }^\circ\text{C}$	55
		$T_C = 100\text{ }^\circ\text{C}$	29
Pulsed Drain Current	I_{DM}	184	A
Single Pulse Avalanche Energy	E_{AS}	80	mJ
Avalanche Current	I_{AS}	70	A
Total Power Dissipation	P_D	71.4	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Thermal Characteristics

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

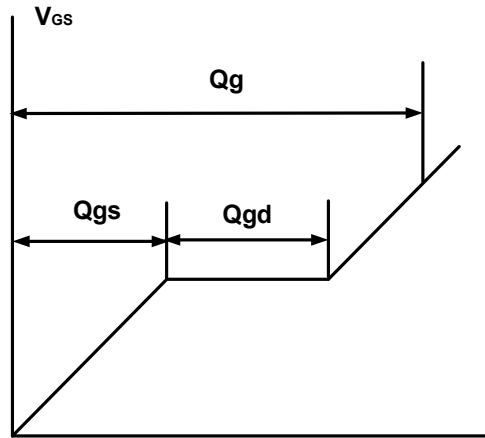
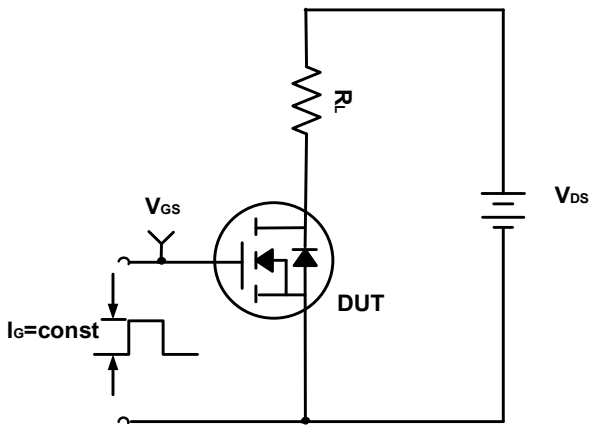
Electrical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$	100	-	-	V
Gate-body Leakage current	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 25^\circ\text{C}$	-	-	1	μA
		$V_{DS} = 100\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 100^\circ\text{C}$	-	-	100	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	1		2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	0.013	0.017	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 15\text{ A}$	-	0.016	0.020	
Forward Transconductance	g_{fs}	$V_{DS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	54	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 50\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	1210	-	μF
Output Capacitance	C_{oss}		-	146	-	
Reverse Transfer Capacitance	C_{rss}		-	11.5	-	
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 50\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 20\text{ A}$	-	22.9	-	nC
Gate-Source Charge	Q_{gs}		-	5	-	
Gate-Drain Charge	Q_{gd}		-	7	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 50\text{ V}$, $I_D \cong 20\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_G = 3\ \Omega$	-	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}	$I_S = 20\text{ A}$, $V_{GS} = 0\text{ V}$	-	-	1.2	V
Continuous Source-Drain Diode Current	I_S	$T_J = 25^\circ\text{C}$	-	-	55	A
Continuous Source Current	I_{SM}		-	-	175	A
Reverse Recovery Charge	Q_{rr}	$T_J = 25^\circ\text{C}$, $I_F = 20\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	-	32	-	nC
Reverse Recovery Time	t_{rr}		-	44	-	ns

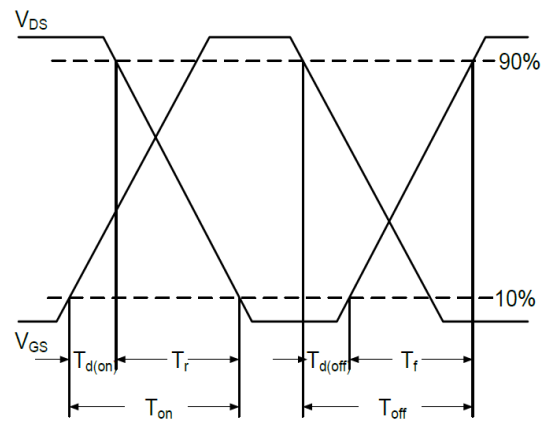
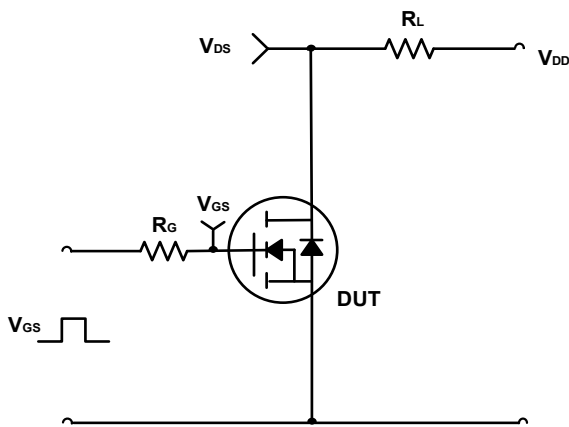
Notes:

- epetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$
- The EAS data shows Max. rating . The test condition is $V_{DD}=25\text{V}, V_{GS}=10\text{V}, L=0.1\text{Mh}, I_{AS}=40\text{A}$.
- 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.
- The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
- This value is guaranteed by design hence it is not included in the production test.

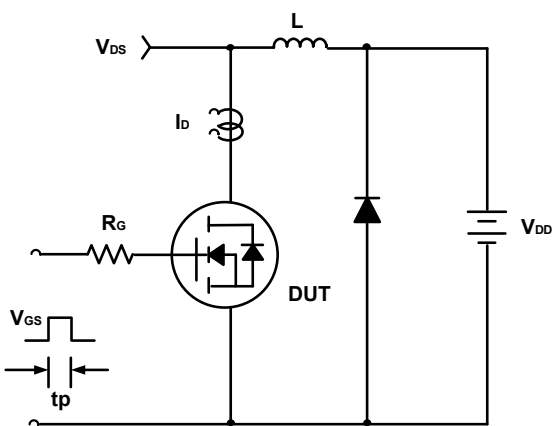
Test circuit and Waveform



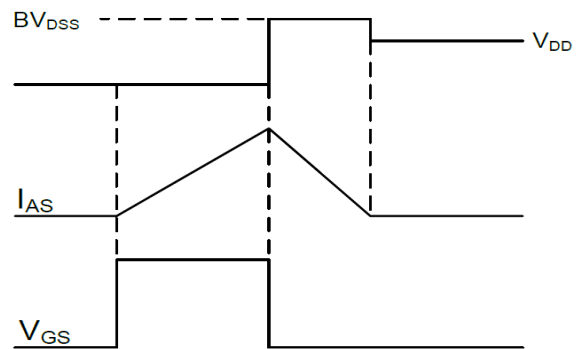
Gate Charge Test Circuit & Waveforms



Switching Test Circuit & Waveforms

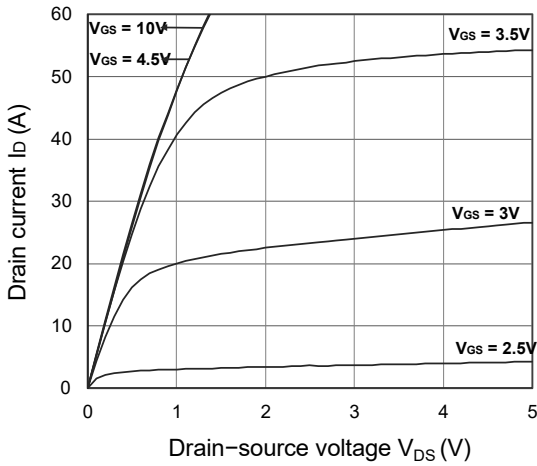


$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

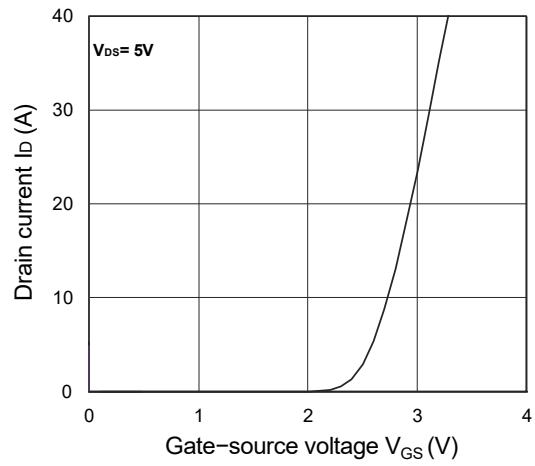


Unclamped Inductive Switching Circuit & Waveforms

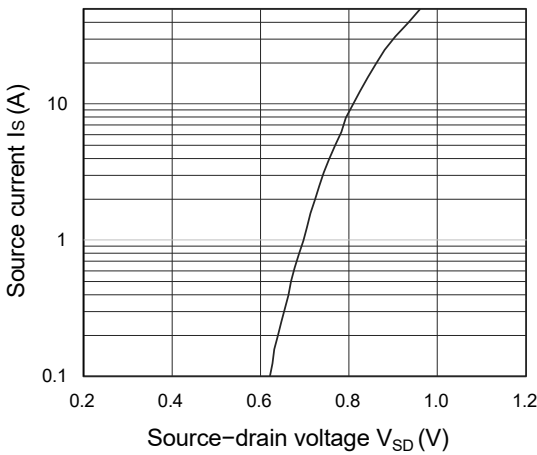
TYPICAL CHARACTERISTICS (25 °C unless noted)



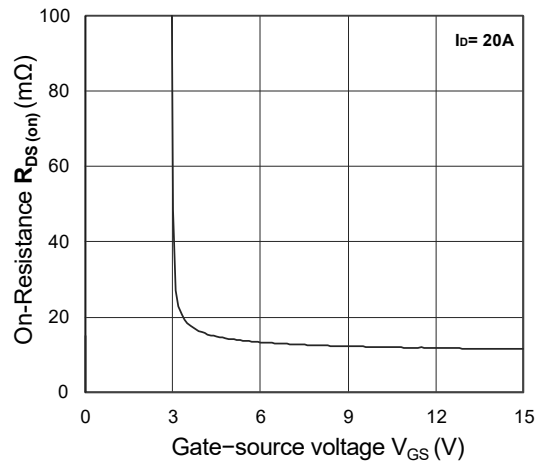
Output Characteristics



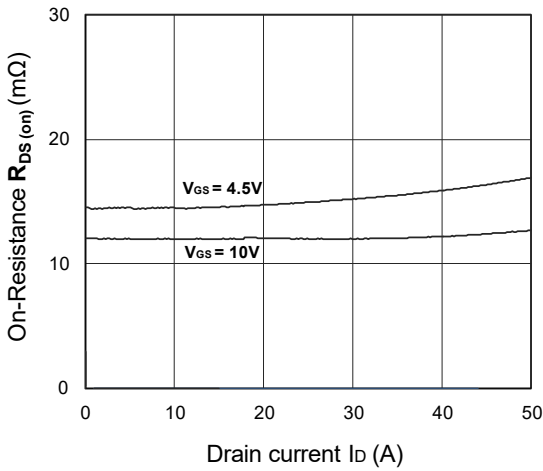
Transfer Characteristics



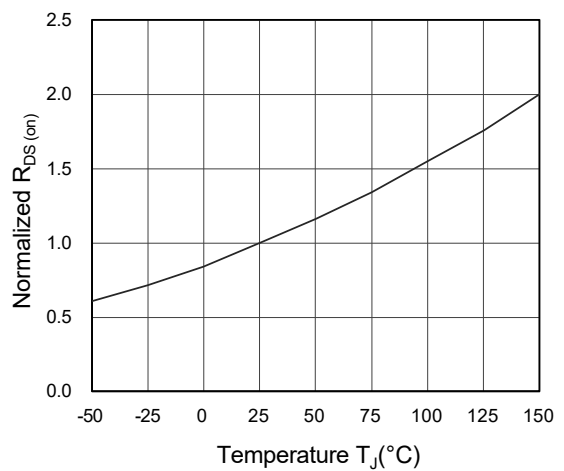
Forward Characteristics of Reverse



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

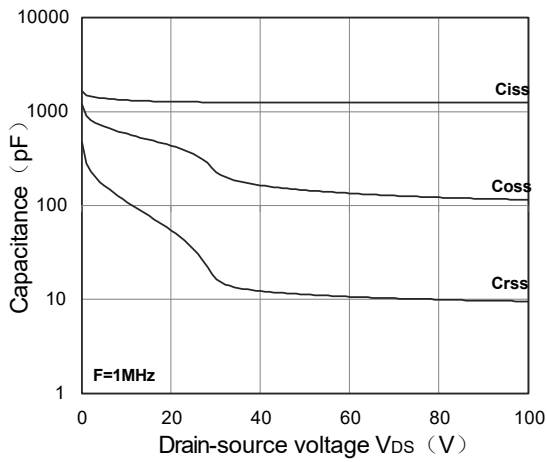


$R_{DS(on)}$ vs. I_D

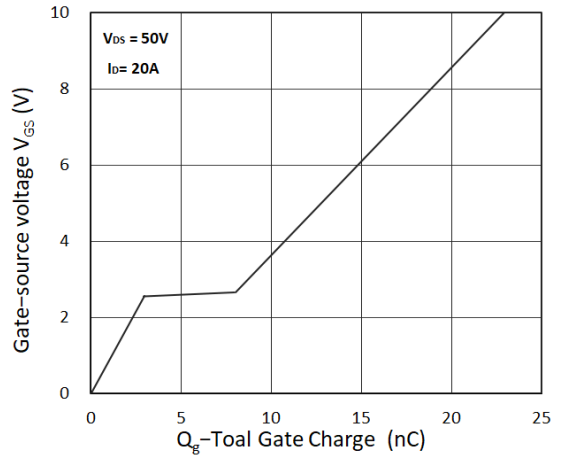


Normalized $R_{DS(on)}$ vs. Temperature

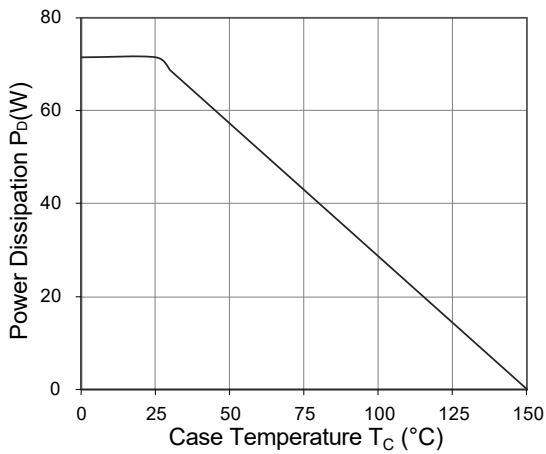
TYPICAL CHARACTERISTICS (25 °C unless noted)



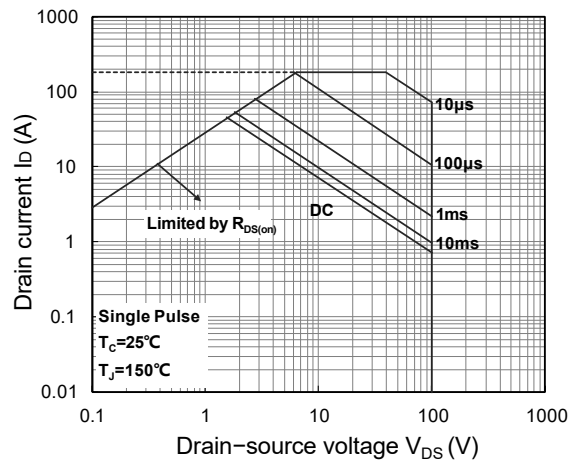
Capacitance Characteristics



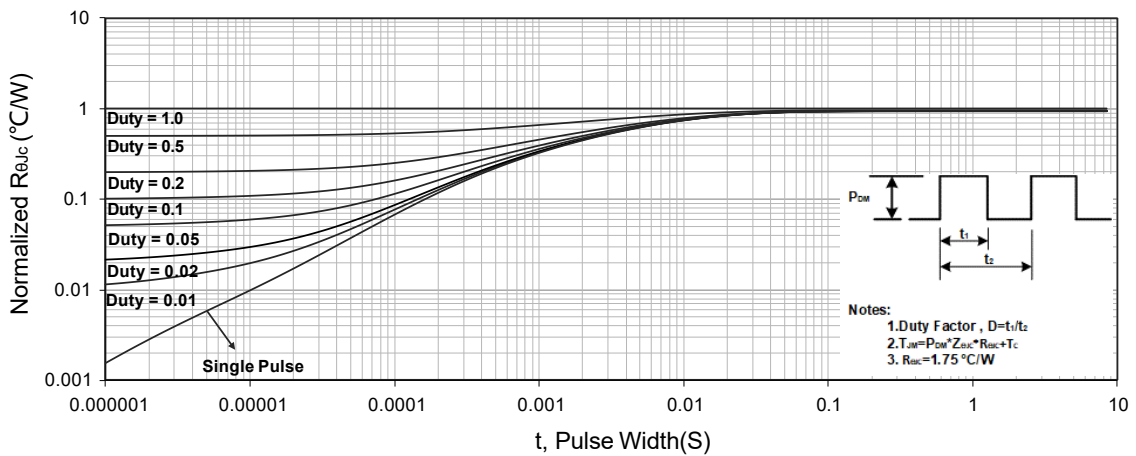
Gate Charge Characteristics



Power Dissipation

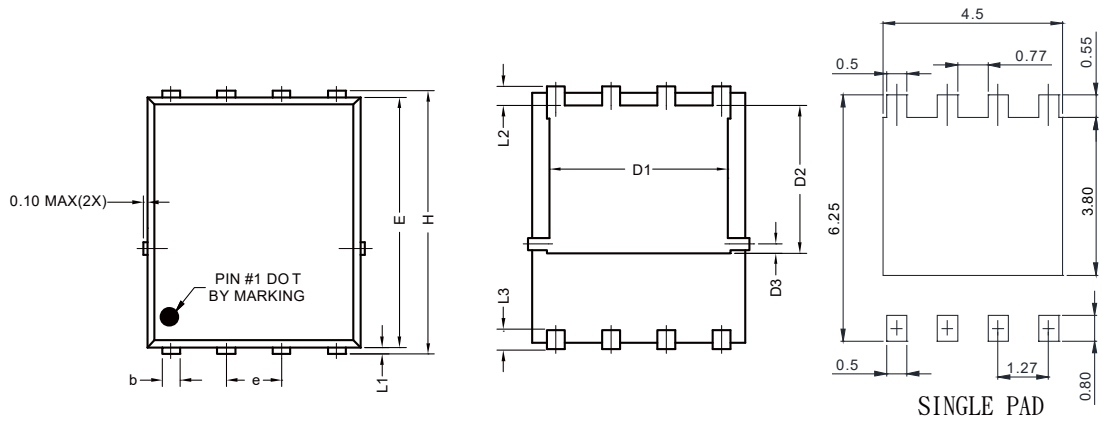


Safe Operating Area

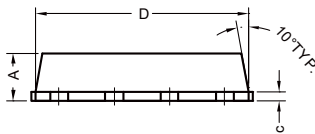


Normalized Maximum Transient Thermal Impedance

PDFN5x6-8L_EP1_P PACKGE OUTLIN



RECOMMENDED LAND PATTERN



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