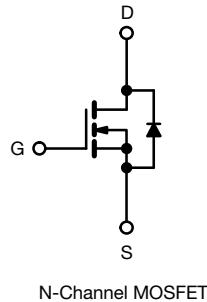
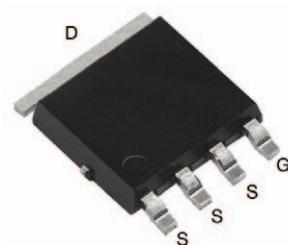


E Series Power MOSFET

PRODUCT SUMMARY	
V_{DS} (V) at T_J max.	700
$R_{DS(on)}$ typ. (Ω) at 25 °C	$V_{GS} = 10$ V 0.520
Q_g max. (nC)	44
Q_{gs} (nC)	6
Q_{gd} (nC)	9
Configuration	Single

PowerPAK® SO-8L Single



FEATURES

- Low figure-of-merit (FOM) $R_{on} \times Q_g$
- Low input capacitance (C_{iss})
- Reduced switching and conduction losses
- Ultra low gate charge (Q_g)
- Avalanche energy rated (UIS)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Switch mode power supplies (SMPS)
- Flyback converter
- Lighting
 - High-intensity discharge (HID)
 - Fluorescent ballast lighting
- Consumer
 - Wall adaptors

ORDERING INFORMATION

Package	PowerPAK SO-8L
Lead (Pb)-free and Halogen-free	SiHJ7N65E-T1-GE3

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	
Continuous Drain Current ($T_J = 150$ °C)	V_{GS} at 10 V	$T_C = 25$ °C	A
		$T_C = 100$ °C	
Pulsed Drain Current ^a	I_D	7.9	
		5.0	
Linear Derating Factor	I_{DM}	17	
Single Pulse Avalanche Energy ^b	E_{AS}	68	mJ
Maximum Power Dissipation	P_D	96	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	°C
Drain-Source Voltage Slope	$T_J = 125$ °C	dV/dt	V/ns
Reverse Diode dV/dt ^d			

Notes

- Repetitive rating; pulse width limited by maximum junction temperature.
- $V_{DD} = 120$ V, starting $T_J = 25$ °C, $L = 28.2$ mH, $R_g = 25$ Ω, $I_{AS} = 2.2$ A.
- $I_{SD} \leq I_D$, $dI/dt = 100$ A/μs, starting $T_J = 25$ °C.

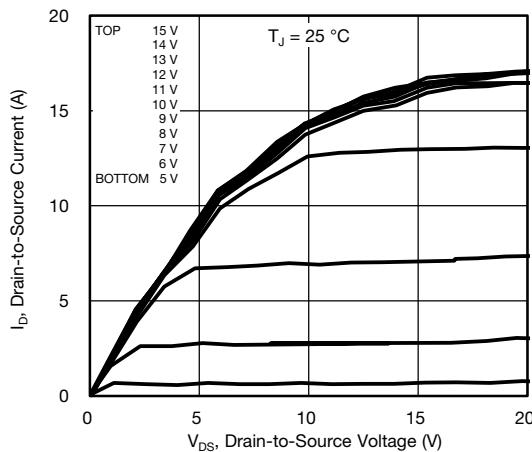
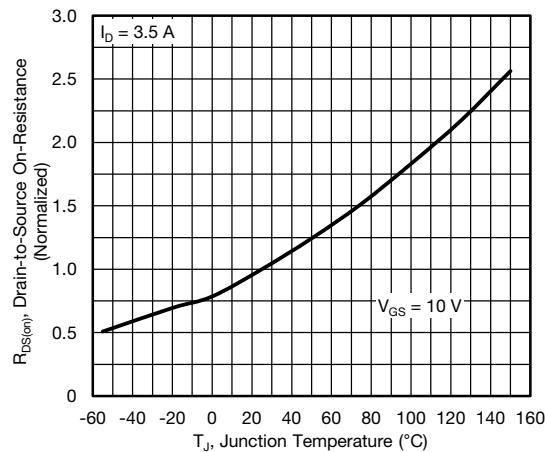
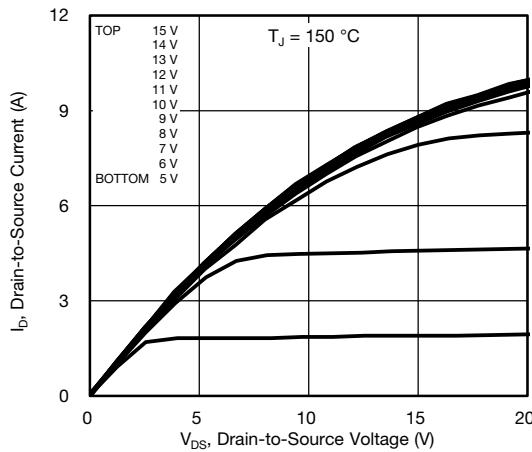
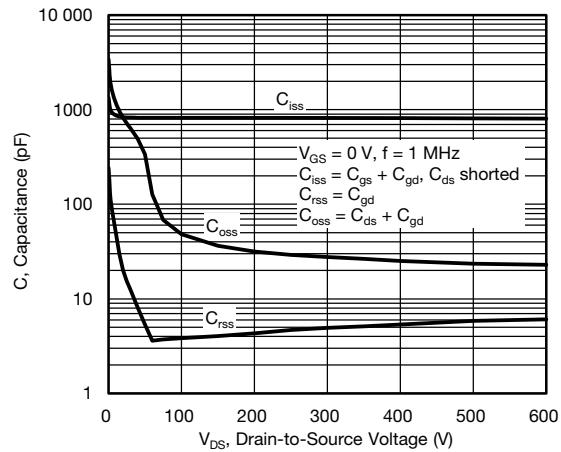
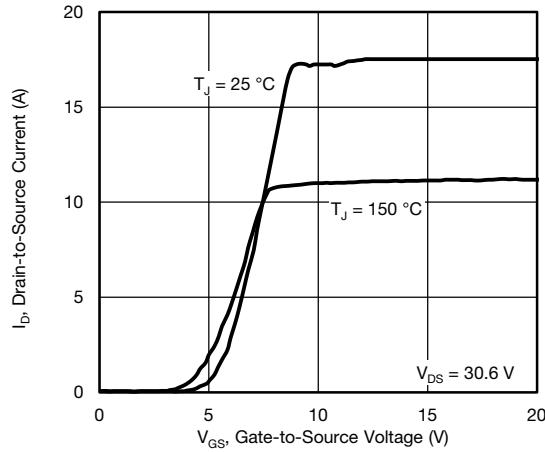
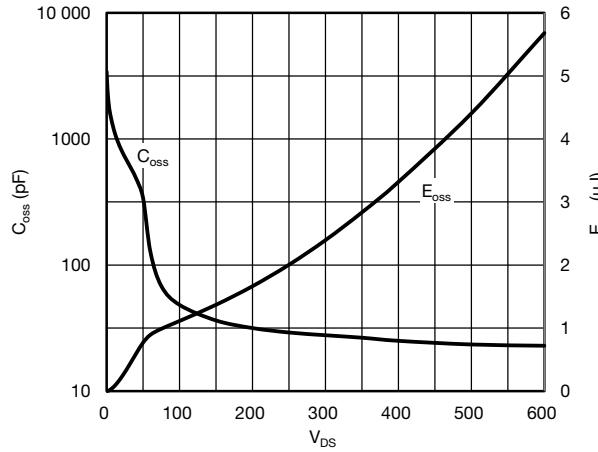
THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	52	65	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	1.3	

SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Static							
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$		650	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	Reference to 25°C , $I_D = 1 \text{ mA}$		-	0.8	-	$\text{V}/^\circ\text{C}$
Gate-Source Threshold Voltage (N)	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$		2.0	-	4.0	V
Gate-Source Leakage	I_{GSS}	$V_{GS} = \pm 20 \text{ V}$		-	-	± 100	nA
		$V_{GS} = \pm 30 \text{ V}$		-	-	± 1	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 650 \text{ V}$, $V_{GS} = 0 \text{ V}$		-	-	1	μA
		$V_{DS} = 520 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$		-	-	10	
Drain-Source On-State Resistance	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$	$I_D = 3.5 \text{ A}$	-	0.520	0.598	Ω
Forward Transconductance	g_{fs}	$V_{DS} = 30 \text{ V}$, $I_D = 3.5 \text{ A}$		-	2.3	-	S
Dynamic							
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 100 \text{ V}$, $f = 1 \text{ MHz}$		-	820	-	pF
Output Capacitance	C_{oss}			-	48	-	
Reverse Transfer Capacitance	C_{rss}			-	4	-	
Effective Output Capacitance, Energy Related ^a	$C_{o(er)}$	$V_{DS} = 0 \text{ V}$ to 520 V , $V_{GS} = 0 \text{ V}$		-	33	-	
Effective Output Capacitance, Time Related ^b	$C_{o(tr)}$			-	118	-	
Total Gate Charge	Q_g			-	22	44	nC
Gate-Source Charge	Q_{gs}	$V_{GS} = 10 \text{ V}$	$I_D = 3.5 \text{ A}$, $V_{DS} = 520 \text{ V}$	-	6	-	
Gate-Drain Charge	Q_{gd}			-	9	-	
Turn-On Delay Time	$t_{d(on)}$			-	16	32	ns
Rise Time	t_r	$V_{DD} = 520 \text{ V}$, $I_D = 3.5 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_g = 9.1 \Omega$		-	18	36	
Turn-Off Delay Time	$t_{d(off)}$		-	30	60		
Fall Time	t_f		-	18	36		
Gate Input Resistance	R_g	$f = 1 \text{ MHz}$		0.4	0.8	1.6	Ω
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I_S	MOSFET symbol showing the integral reverse p - n junction diode		-	-	7.9	A
Pulsed Diode Forward Current	I_{SM}			-	-	17	
Diode Forward Voltage	V_{SD}	$T_J = 25^\circ\text{C}$, $I_S = 3.5 \text{ A}$, $V_{GS} = 0 \text{ V}$		-	0.9	1.2	V
Reverse Recovery Time	t_{rr}	$T_J = 25^\circ\text{C}$, $I_F = I_S = 3.5 \text{ A}$, $dl/dt = 100 \text{ A}/\mu\text{s}$, $V_R = 25 \text{ V}$		-	299	598	ns
Reverse Recovery Charge	Q_{rr}			-	2.9	5.8	μC
Reverse Recovery Current	I_{RRM}			-	16	-	A

Notes

a. $C_{oss(er)}$ is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .
b. $C_{oss(tr)}$ is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS} .

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

Fig. 1 - Typical Output Characteristics

Fig. 4 - Normalized On-Resistance vs. Temperature

Fig. 2 - Typical Output Characteristics

Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage

Fig. 3 - Typical Transfer Characteristics

Fig. 6 - Coss and Eoss vs. VDS

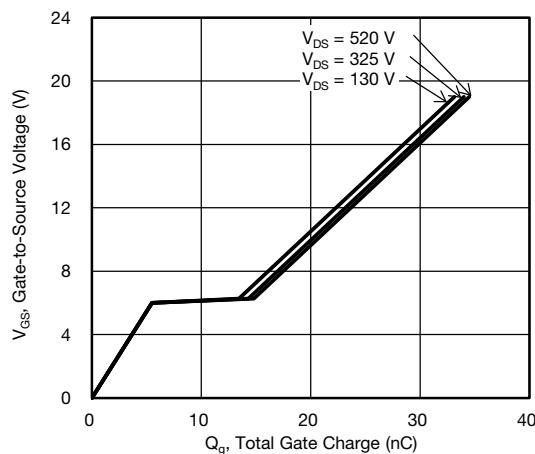


Fig. 7 - Typical Gate Charge vs. Gate-to-Source Voltage

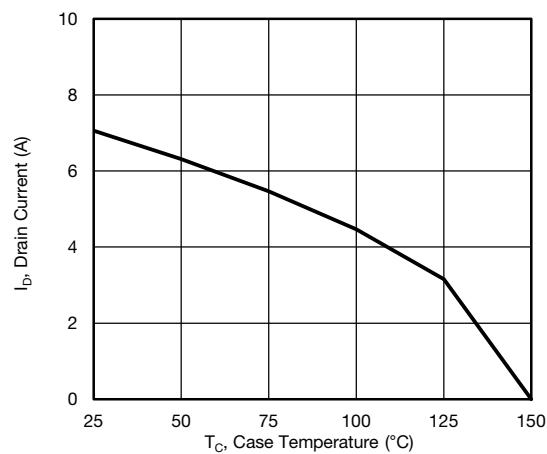


Fig. 10 - Maximum Drain Current vs. Case Temperature

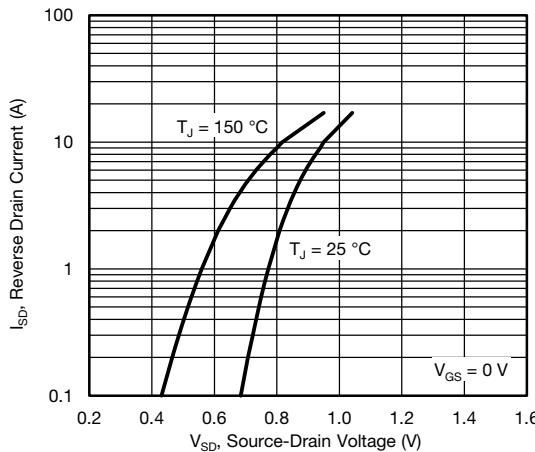


Fig. 8 - Typical Source-Drain Diode Forward Voltage

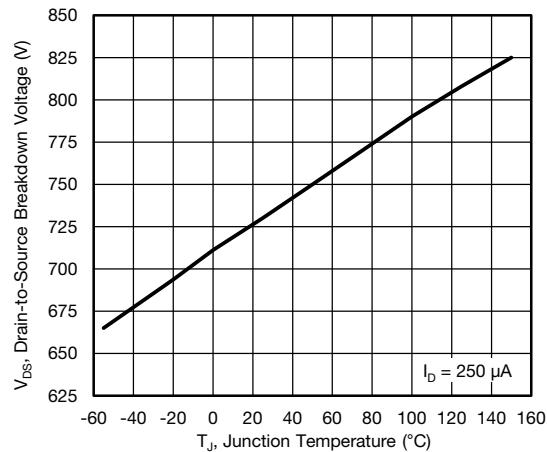


Fig. 11 - Temperature vs. Drain-to-Source Voltage

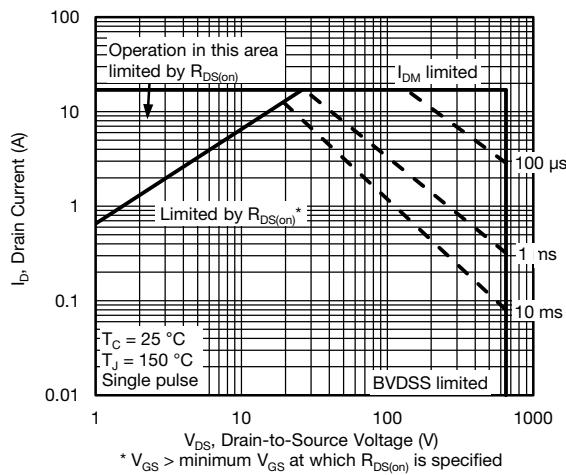


Fig. 9 - Maximum Safe Operating Area

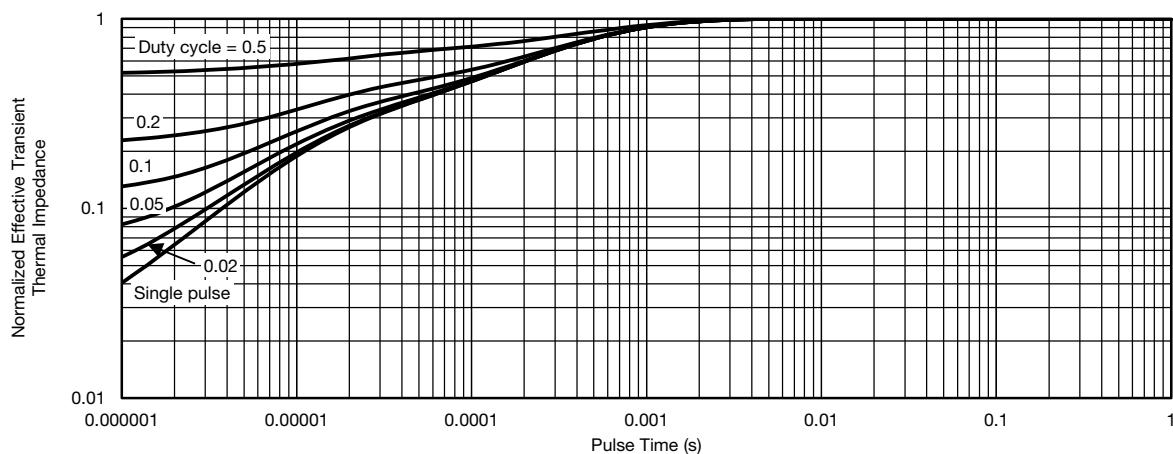


Fig. 12 - Normalized Thermal Transient Impedance, Junction-to-Case

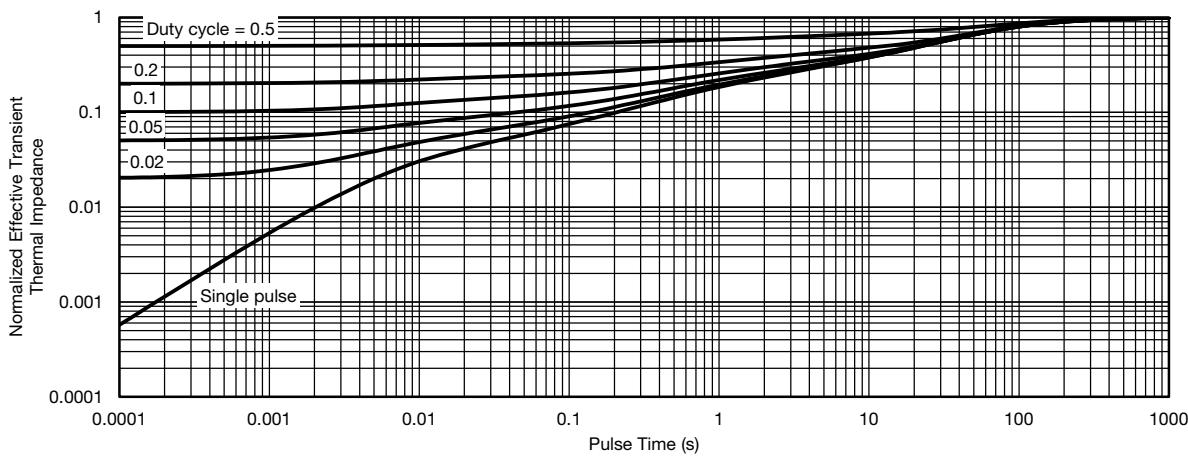


Fig. 13 - Normalized Thermal Transient Impedance, Junction-to-Ambient

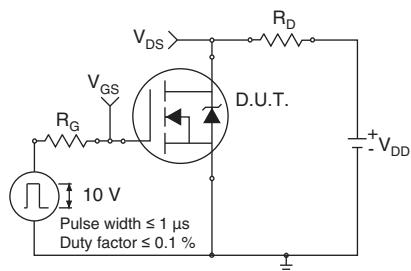


Fig. 14 - Switching Time Test Circuit

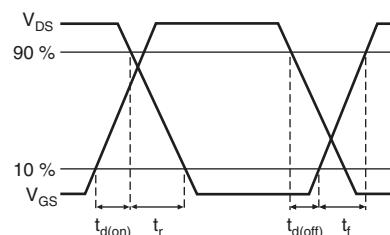
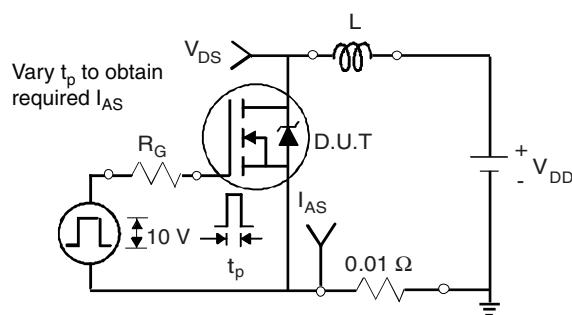
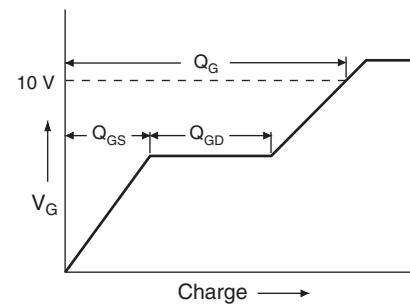
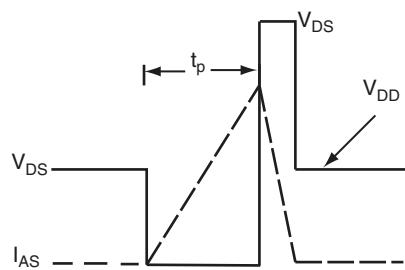
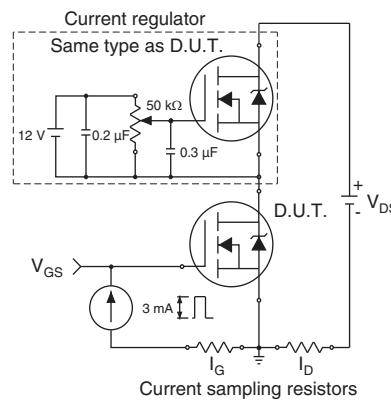
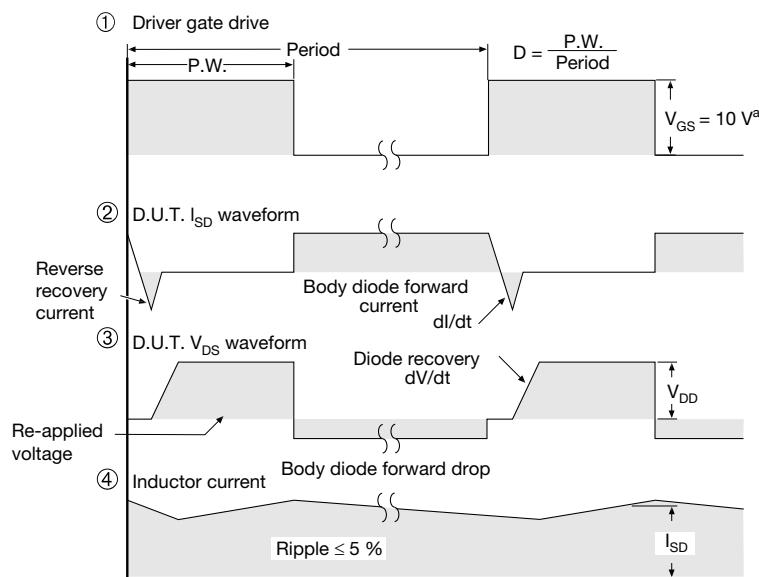
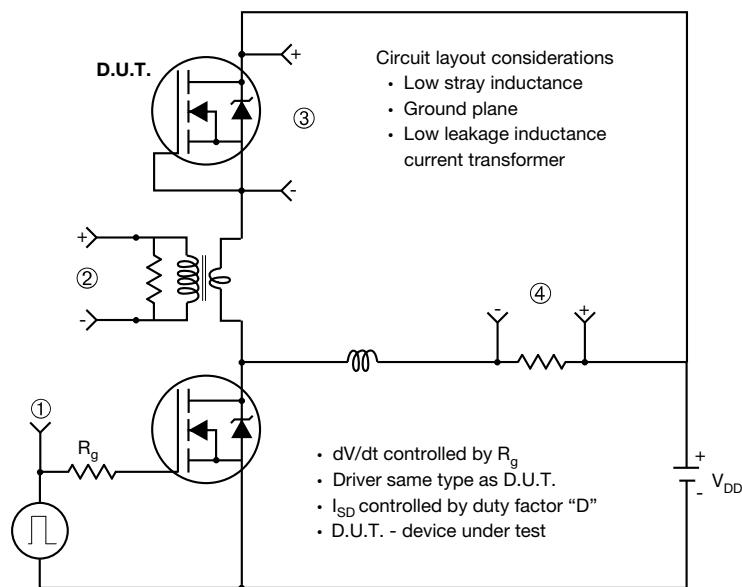


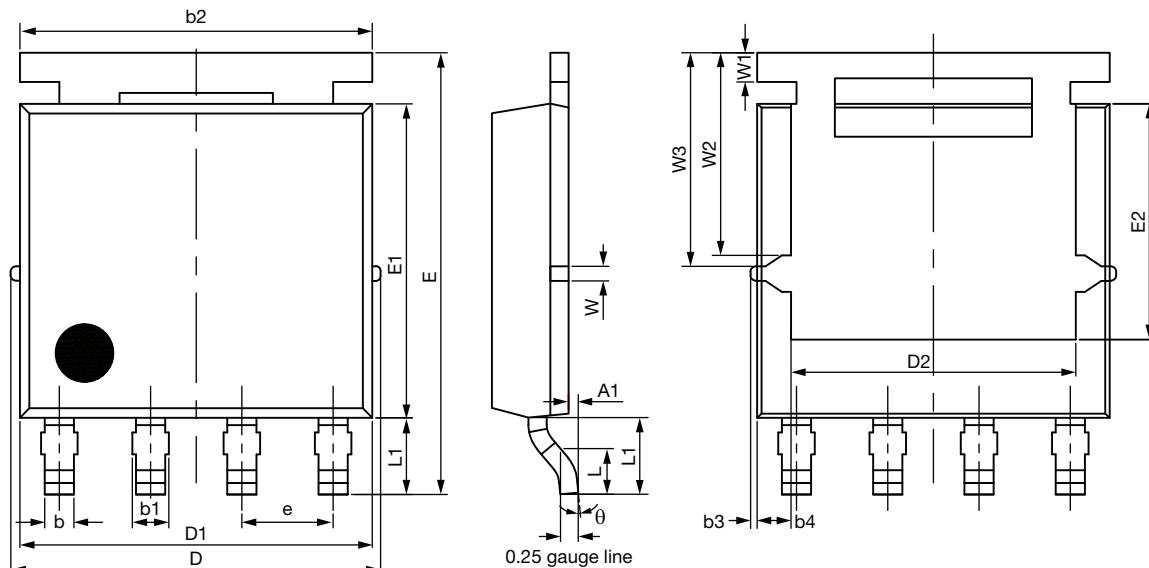
Fig. 15 - Switching Time Waveforms


Fig. 16 - Unclamped Inductive Test Circuit

Fig. 18 - Basic Gate Charge Waveform

Fig. 17 - Unclamped Inductive Waveforms

Fig. 19 - Gate Charge Test Circuit

Peak Diode Recovery dV/dt Test Circuit

Fig. 20 - For N-Channel

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PowerPAK® SO-8L Case Outline for Non-AI Parts


Topside view
Backside view (single)
Backside view (dual)

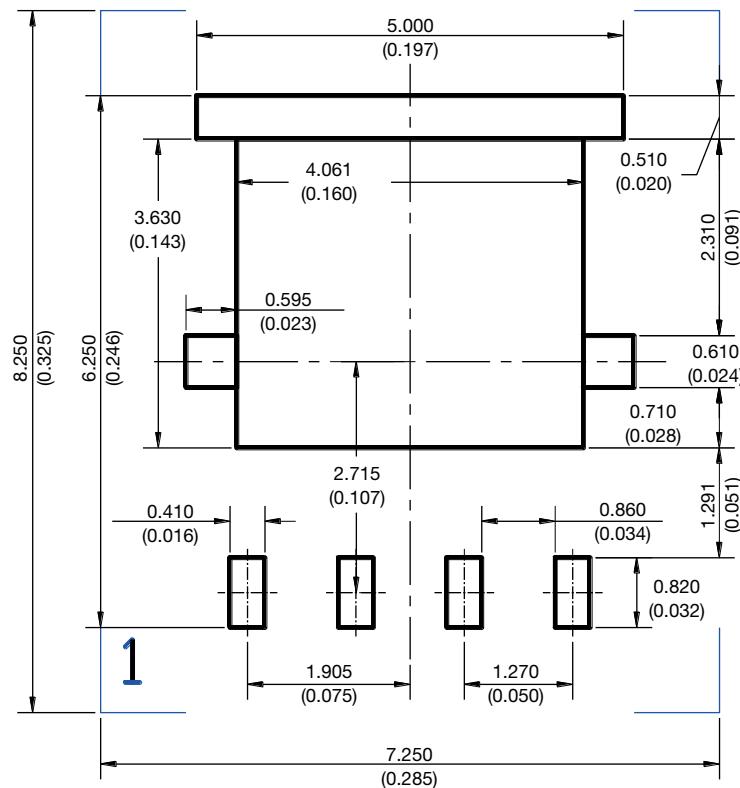
DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	1.00	1.07	1.14	0.039	0.042	0.045
A1	0.00	-	0.127	0.00	-	0.005
b	0.33	0.41	0.48	0.013	0.016	0.019
b1	0.44	0.51	0.58	0.017	0.020	0.023
b2	4.80	4.90	5.00	0.189	0.193	0.197
b3	0.094			0.004		
b4	0.47			0.019		
c	0.20	0.25	0.30	0.008	0.010	0.012
D	5.00	5.13	5.25	0.197	0.202	0.207
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.86	3.96	4.06	0.152	0.156	0.160
D3	1.63	1.73	1.83	0.064	0.068	0.072
e	1.27 BSC			0.050 BSC		
E	6.05	6.15	6.25	0.238	0.242	0.246
E1	4.27	4.37	4.47	0.168	0.172	0.176
E2	3.18	3.28	3.38	0.125	0.129	0.133
F	-	-	0.15	-	-	0.006
L	0.62	0.72	0.82	0.024	0.028	0.032
L1	0.92	1.07	1.22	0.036	0.042	0.048
K	0.51			0.020		
W	0.23			0.009		
W1	0.41			0.016		
W2	2.82			0.111		
W3	2.96			0.117		
θ	0°	-	10°	0°	-	10°

ECN: T16-0221-Rev. D, 16-May-16

DWG: 5976

Note

- Millimeters will govern

RECOMMENDED MINIMUM PAD FOR PowerPAK® SO-8L SINGLE


Recommended Minimum Pads
Dimensions in mm (inches)

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