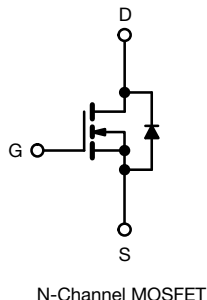
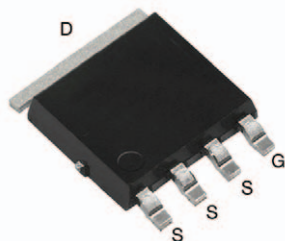


E Series Power MOSFET

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_{DM}	17	
Linear Derating Factor		0.77	W/°C
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	dV/dt	70	V/ns
Reverse Diode dV/dt ^d		14	


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/ μ s, starting $T_J = 25$ °C.

THERMAL RESISTANCE RATINGS

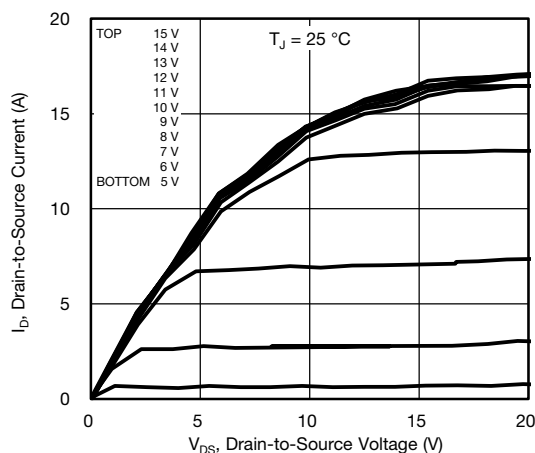
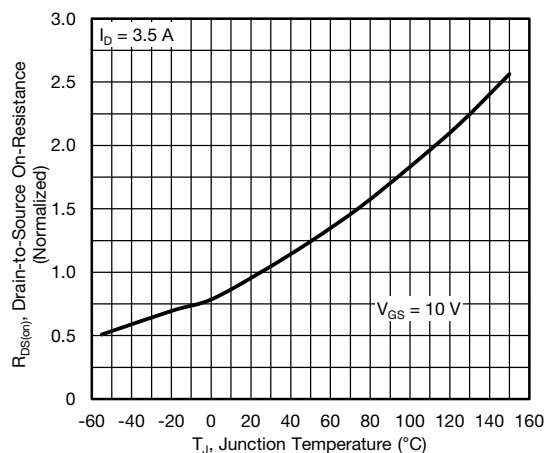
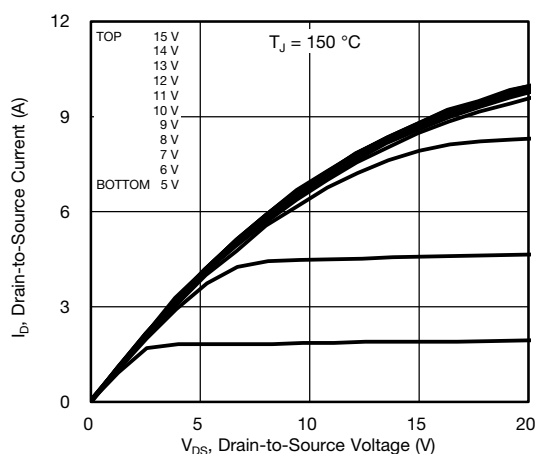
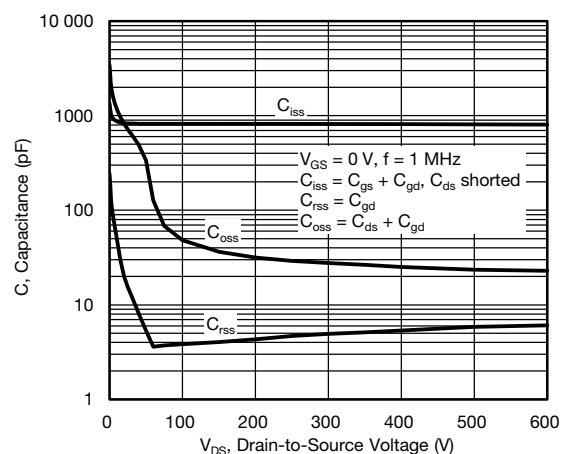
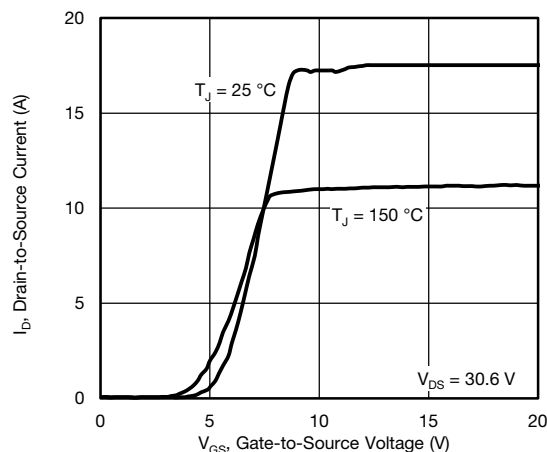
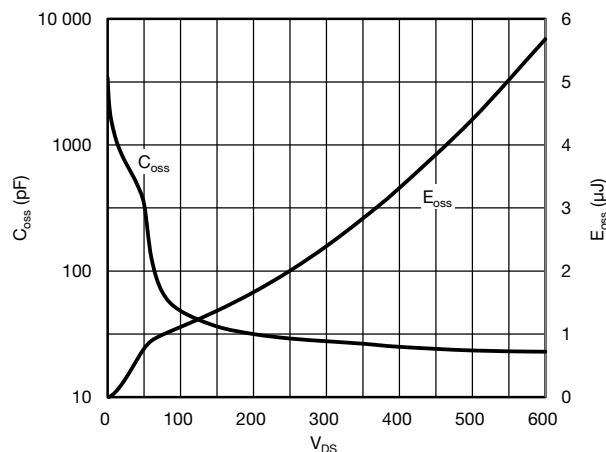
PARAMETER	SYMBOL	TYP.	MAX.	UNIT
Maximum Junction-to-Ambient	R_{thJA}	52	65	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	1.0	1.3	

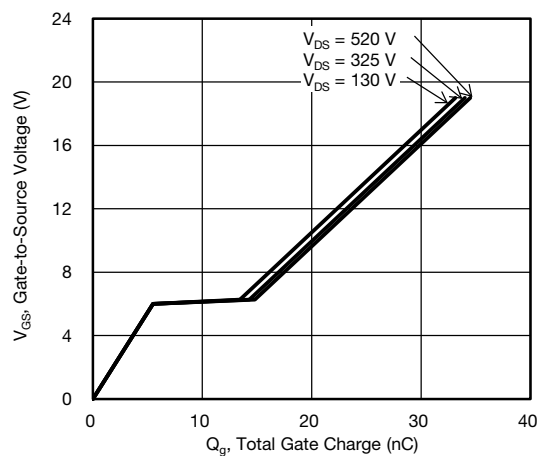
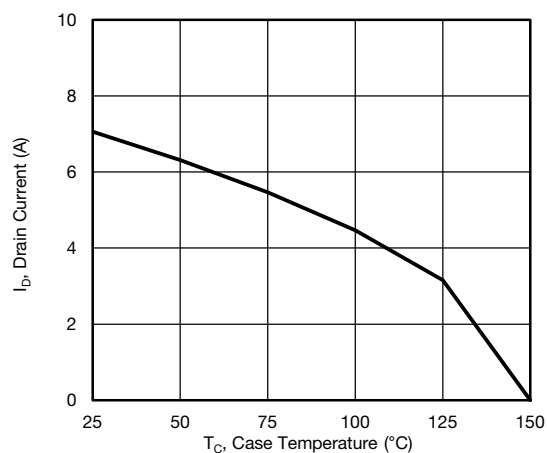
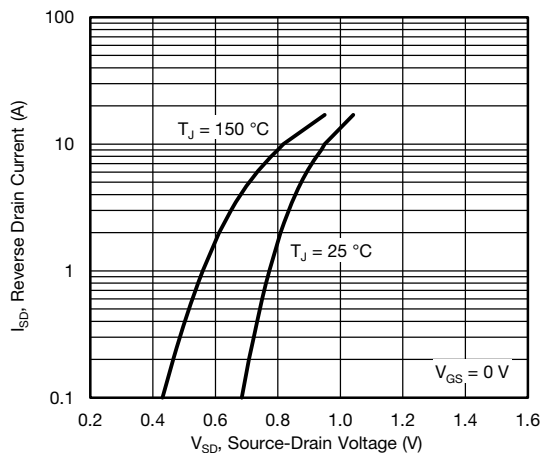
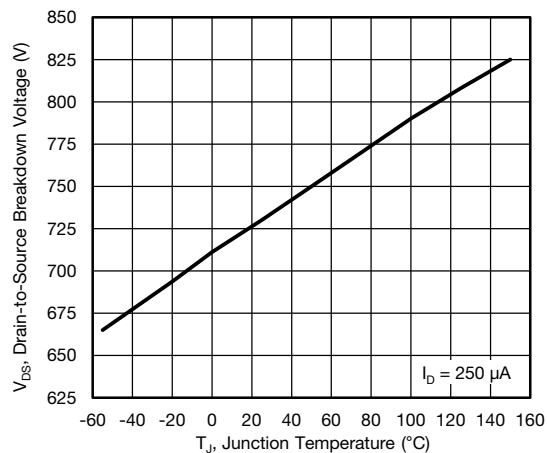
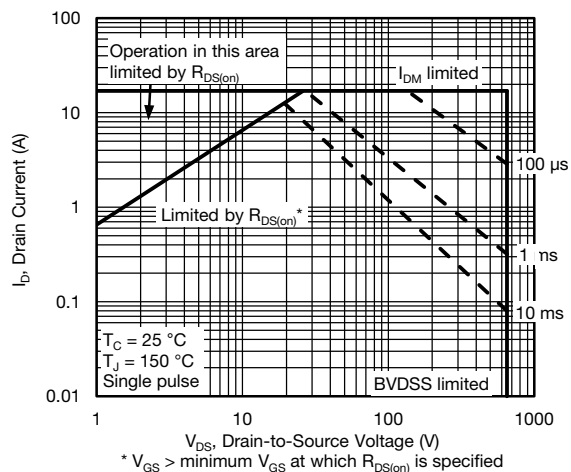


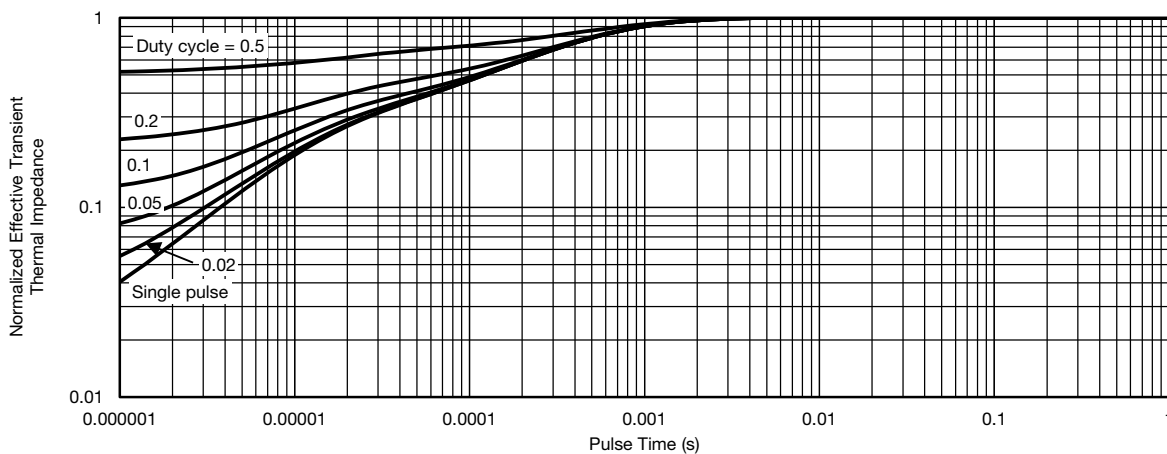
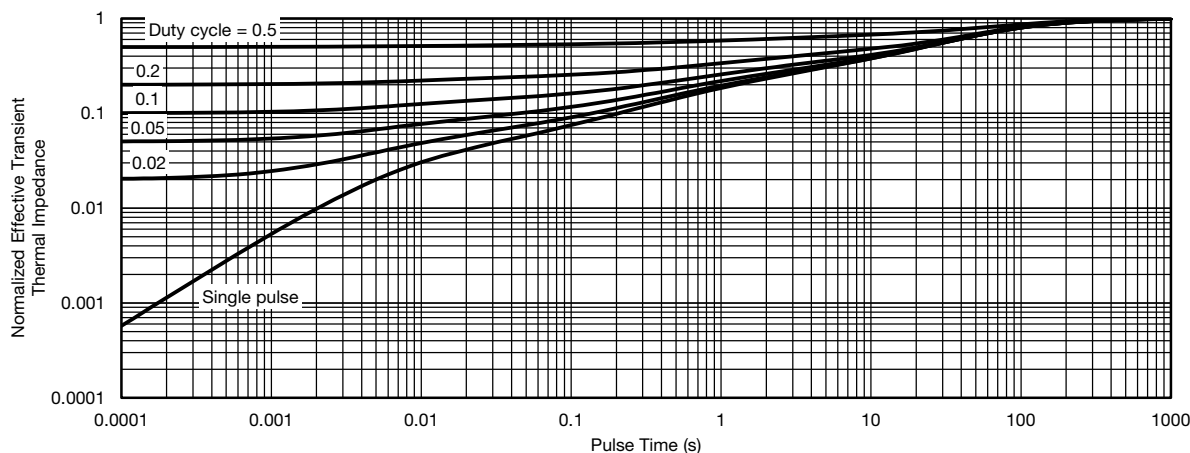
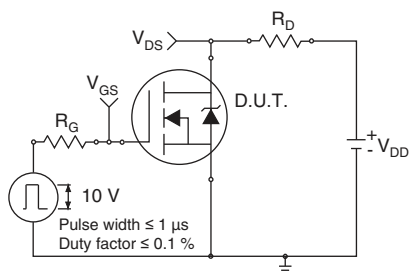
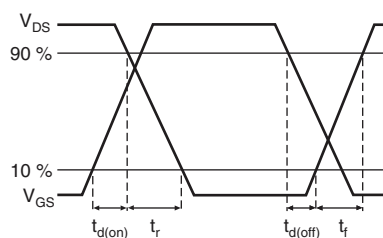
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	650	-	-	V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	Reference to 25 °C, I _D = 1 mA	-	0.8	-	V/°C
Gate-Source Threshold Voltage (N)	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.0	-	4.0	V
Gate-Source Leakage	I _{GSS}	V _{GS} = ± 20 V	-	-	± 100	nA
		V _{GS} = ± 30 V	-	-	± 1	μA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 650 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 520 V, V _{GS} = 0 V, T _J = 125 °C	-	-	10	
Drain-Source On-State Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 3.5 A	-	0.520	0.598	Ω
Forward Transconductance	g _{fs}	V _{DS} = 30 V, I _D = 3.5 A	-	2.3	-	S
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 100 V, f = 1 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 V to 520 V, V _{GS} = 0 V	-	33	-	
Effective Output Capacitance, Time Related ^b	C _{o(tr)}		-	118	-	
Total Gate Charge	Q _g	V _{GS} = 10 V, I _D = 3.5 A, V _{DS} = 520 V	-	22	44	nC
Gate-Source Charge	Q _{gs}		-	6	-	
Gate-Drain Charge	Q _{gd}		-	9	-	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 520 V, I _D = 3.5 A, V _{GS} = 10 V, R _g = 9.1 Ω	-	16	32	ns
Rise Time	t _r		-	18	36	
Turn-Off Delay Time	t _{d(off)}		-	30	60	
Fall Time	t _f		-	18	36	
Gate Input Resistance	R _g	f = 1 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 °C, I _S = 3.5 A, V _{GS} = 0 V	-	0.9	1.2	V
Reverse Recovery Time	t _{rr}	T _J = 25 °C, I _F = I _S = 3.5 A, di/dt = 100 A/μs, V _R = 25 V	-	299	598	ns
Reverse Recovery Charge	Q _{rr}		-	2.9	5.8	μC
Reverse Recovery Current	I _{RRM}		-	16	-	A

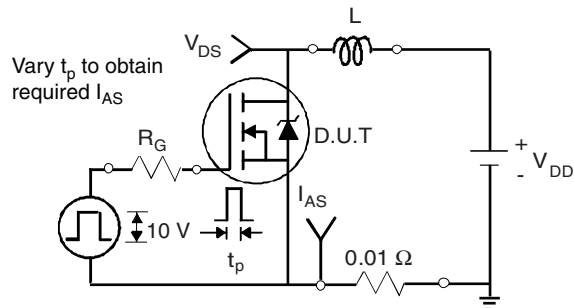
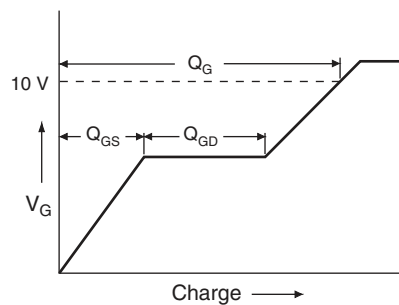
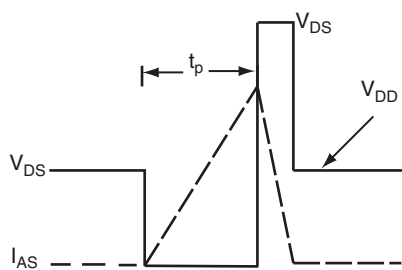
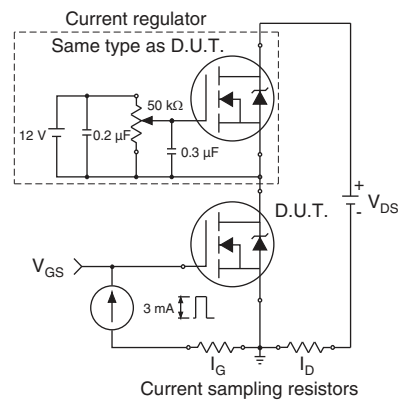
Notes

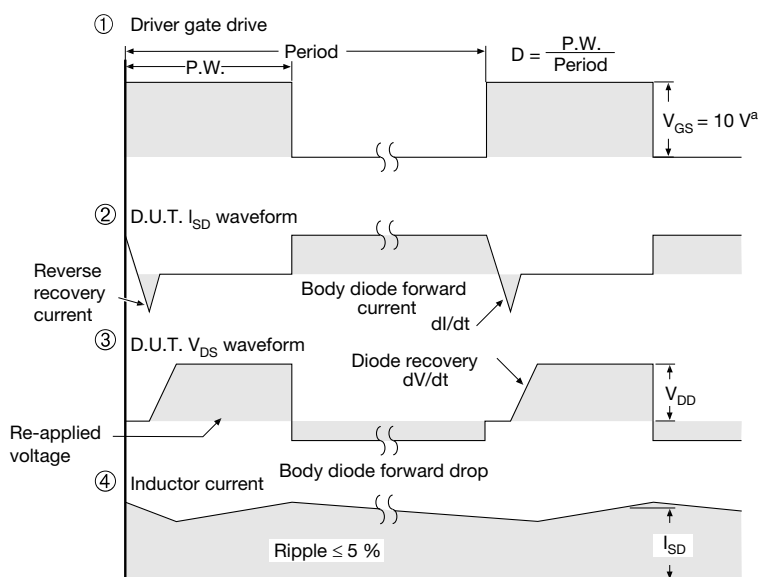
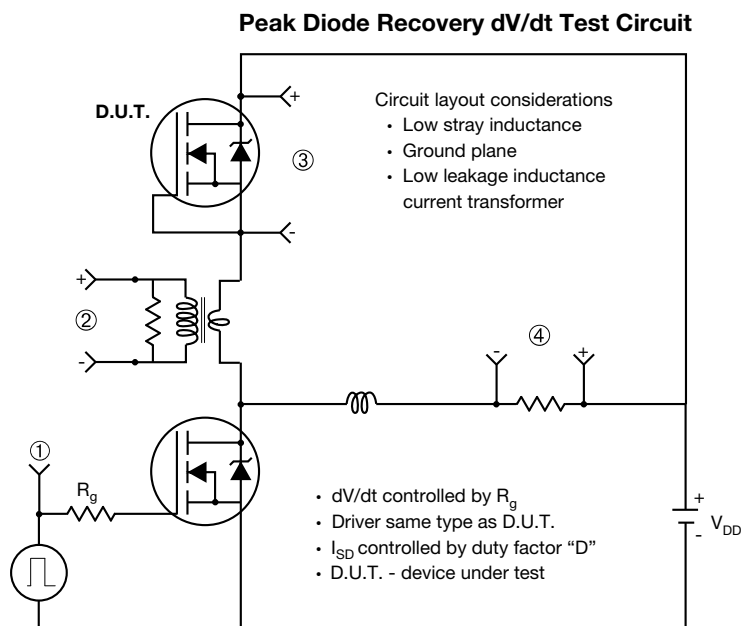
- a. C_{oss(er)} is a fixed capacitance that gives the same energy as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS}.
b. C_{oss(tr)} is a fixed capacitance that gives the same charging time as C_{oss} while V_{DS} is rising from 0 % to 80 % V_{DSS}.

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 - C_{oss} and E_{oss} vs. V_{DS}


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

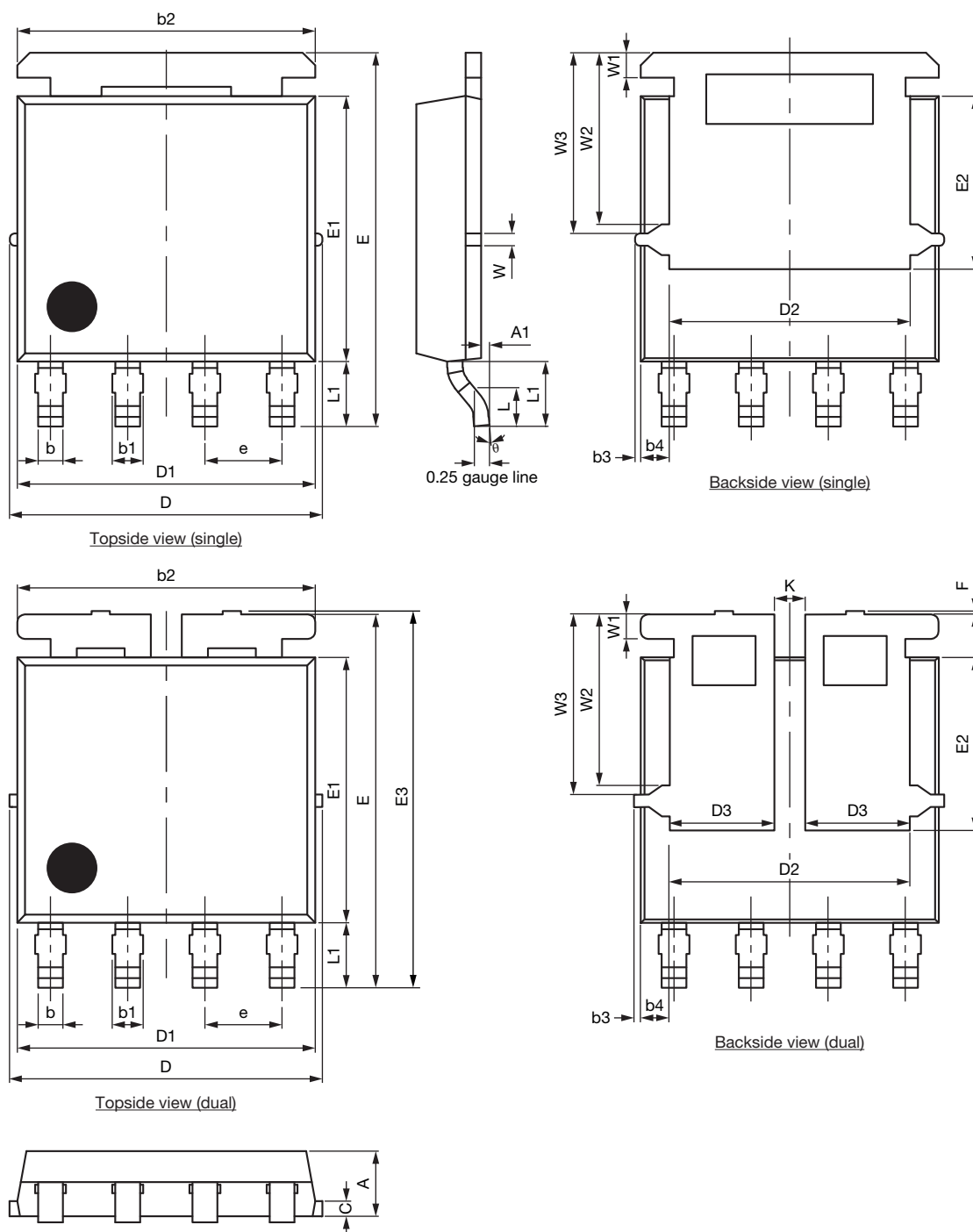

Note

a. $V_{GS} = 5 V$ for logic level devices

Fig. 20 - For N-Channel

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PowerPAK® SO-8L Case Outline 2





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	2.75	2.85	2.95	0.108	0.112	0.116
E3	6.05	6.22	6.40	0.238	0.245	0.252
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: C23-1026-Rev. D, 25-Sep-2023 DWG: 6044						

Note

- Millimeters will govern



RECOMMENDED MINIMUM PAD FOR PowerPAK® SO-8L SINGLE



Recommended Minimum Pads
Dimensions in mm (inches)



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