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PSMN9R0-30LL-VB Datasheet
N-Channel 30-V (D-S) MOSFET

V_{DS}		30	V
$R_{DS(on),typ}$	V_{GS}=10V	13	mΩ
$R_{DS(on),typ}$	V_{GS}=4.5V	19	mΩ
I_D		30	A

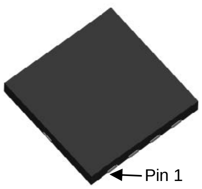
FEATURES
- **Halogen-free**
- Trench Power MOSFET
- 100 % R_g and UIS Tested

RoHS
COMPLIANT

APPLICATIONS
- DC/DC Conversion
  - Low-Side Switch
- Notebook PC
- Gaming

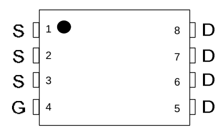
DFN 3x3 EP

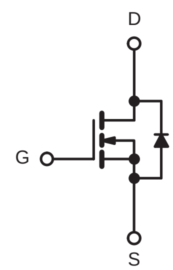
Top View



Bottom View

Top View





N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	30	A
	T_C = 70 °C		20	
	T_A = 25 °C		21.5[b, c]	
	T_A = 70 °C		17.1[b, c]	
Pulsed Drain Current		I_{DM}	100	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	13	
	T_A = 25 °C		3.1[b, c]	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	10	
Avalanche Energy		E_{AS}	5	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	60	W
	T_C = 70 °C		30	
	T_A = 25 °C		3.7[b, c]	
	T_A = 70 °C		2.4[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b, d]	t ≤ 10 s	R_{thJA}	27	34	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	6	7.5	

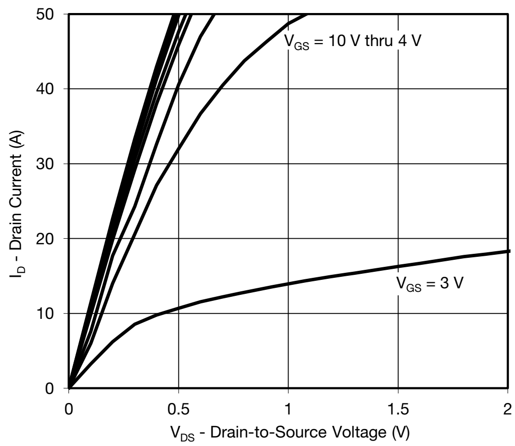
Notes:
a. Based on T_C = 25 °C.
b. Surface Mounted on 1" x 1" FR4 board.
c. t = 10 s.
d. Maximum under Steady State conditions is 85 °C/W.

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 = 1 mA	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA		27		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.6		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 µA	1.0		3.0	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1	µA
		V_{DS} = 30 V, V_{GS} = 0 V, T_J = 55 °C			10	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ 5 V, V_{GS} = 10 V	30			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 15 A		13		mΩ
		V_{GS} = 4.5 V, I_D = 10 A		19		
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 15 A		75		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz			900	pF
Output Capacitance	C_{oss}				236	
Reverse Transfer Capacitance	C_{rss}				20	
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 10 A			20	nC
		V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 10 A			9	
Gate-Source Charge	Q_{gs}				2.1	
Gate-Drain Charge	Q_{gd}				0.7	
Gate Resistance	R_g	f = 1 MHz	0.2	1.1	2.2	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 1.5 Ω $I_D \cong$ 10 A, V_{GEN} = 4.5 V, R_g = 1 Ω		8	16	ns
Rise Time	t_r			16	30	
Turn-Off Delay Time	$t_{d(off)}$			17	35	
Fall Time	t_f			7	15	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 1.5 Ω $I_D \cong$ 10 A, V_{GEN} = 10 V, R_g = 1 Ω		14	30	
Rise Time	t_r			50	100	
Turn-Off Delay Time	$t_{d(off)}$			16	30	
Fall Time	t_f			8	18	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			13	A
Pulse Diode Forward Current[a]	I_{SM}				100	
Body Diode Voltage	V_{SD}	I_S = 3 A			1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 10 A, dI/dt = 100 A/µs, T_J = 25 °C			40	ns
Body Diode Reverse Recovery Charge	Q_{rr}				20	nC
Reverse Recovery Fall Time	t_a			12.5		ns
Reverse Recovery Rise Time	t_b			7.5		

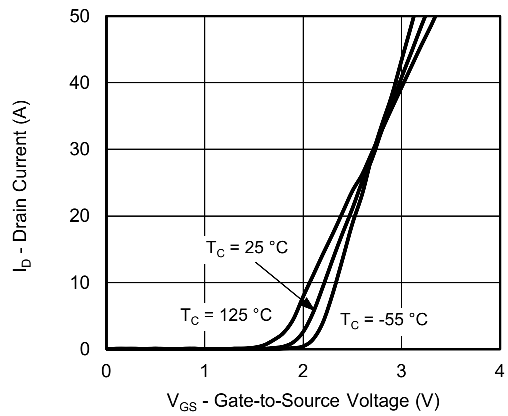
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

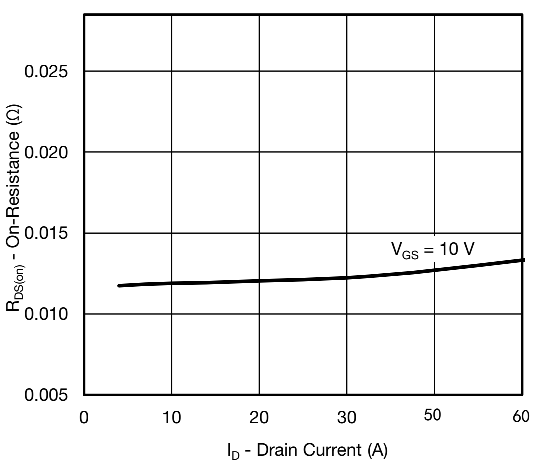
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



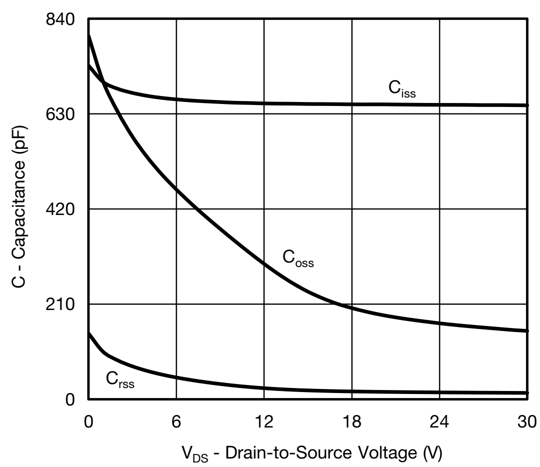
Output Characteristics



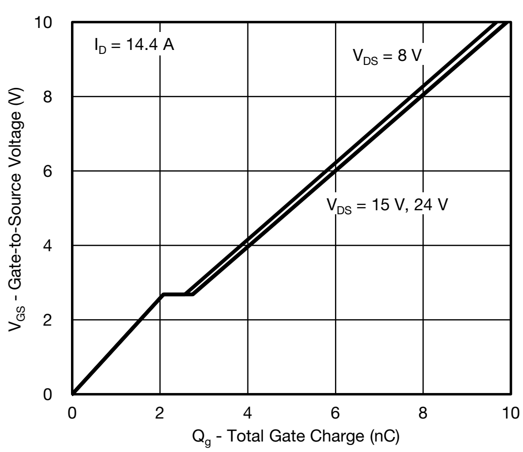
Transfer Characteristics



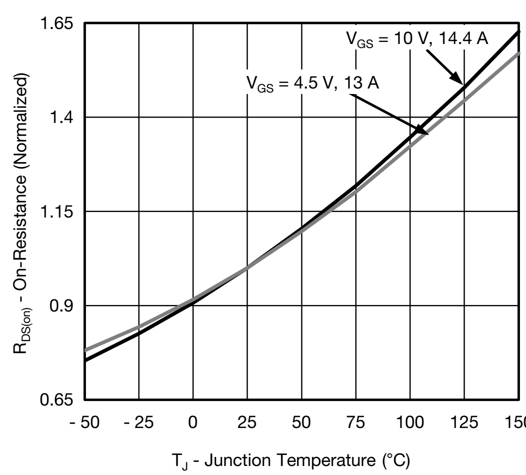
On-Resistance vs. Drain Current



Capacitance

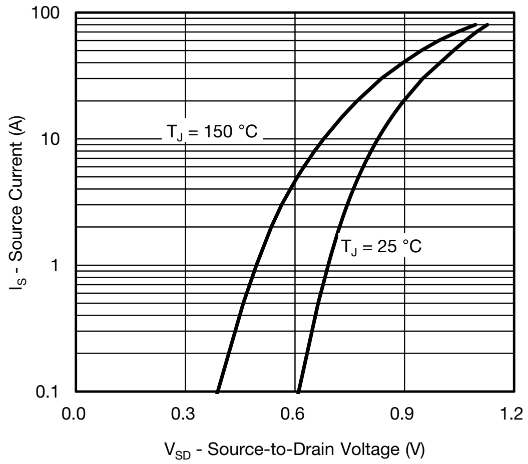


Gate Charge

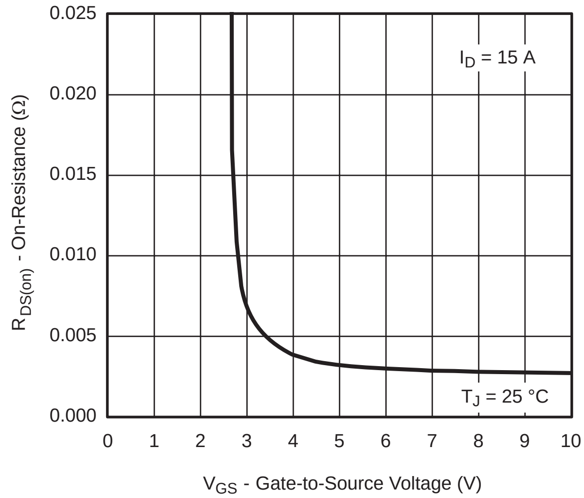


On-Resistance vs. Junction Temperature

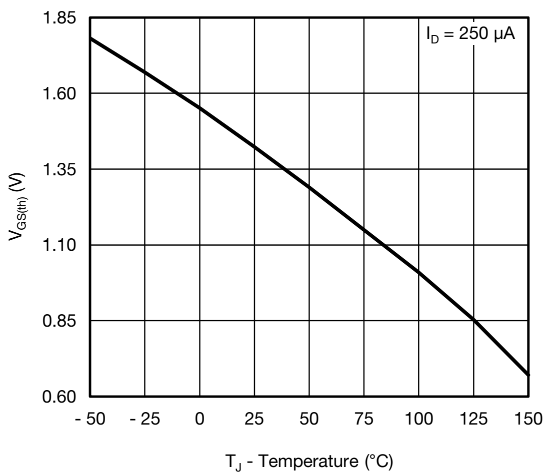
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



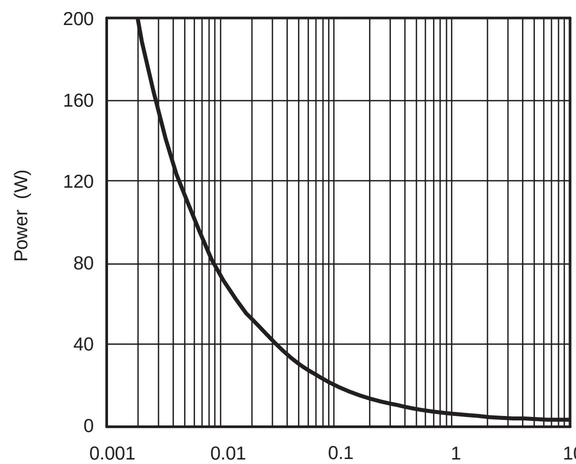
Source-Drain Diode Forward Voltage



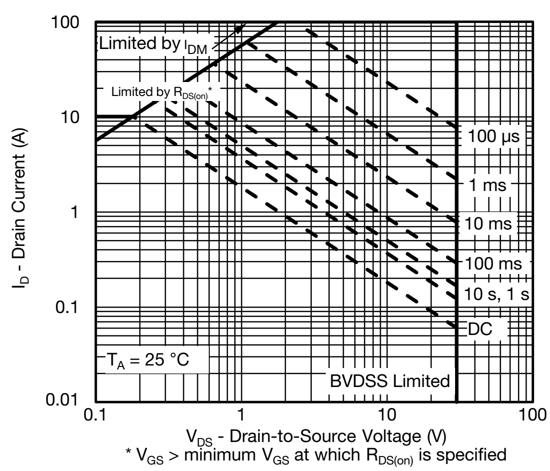
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

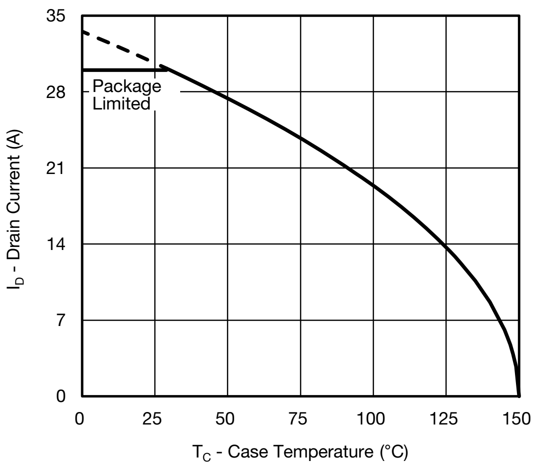


Single Pulse Power

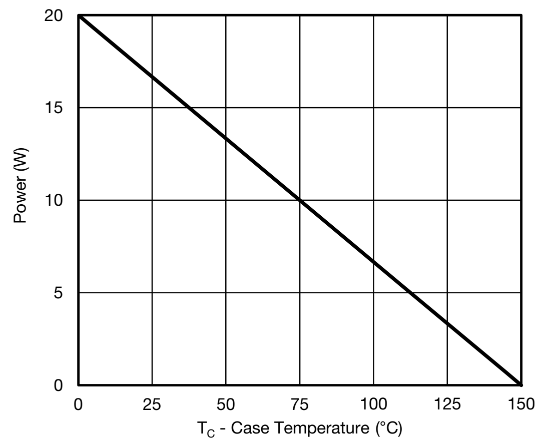


Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating [a]

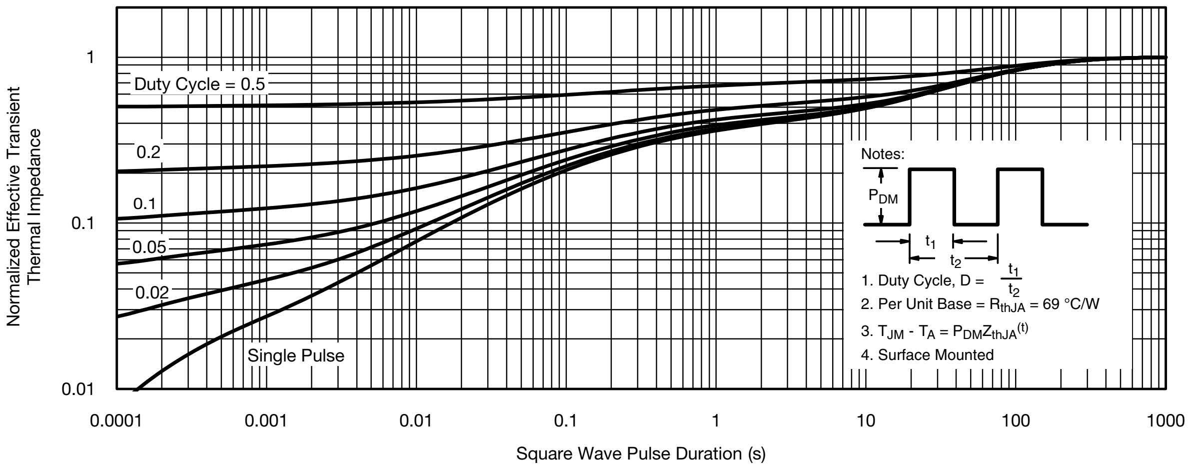


Power, Junction-to-Case

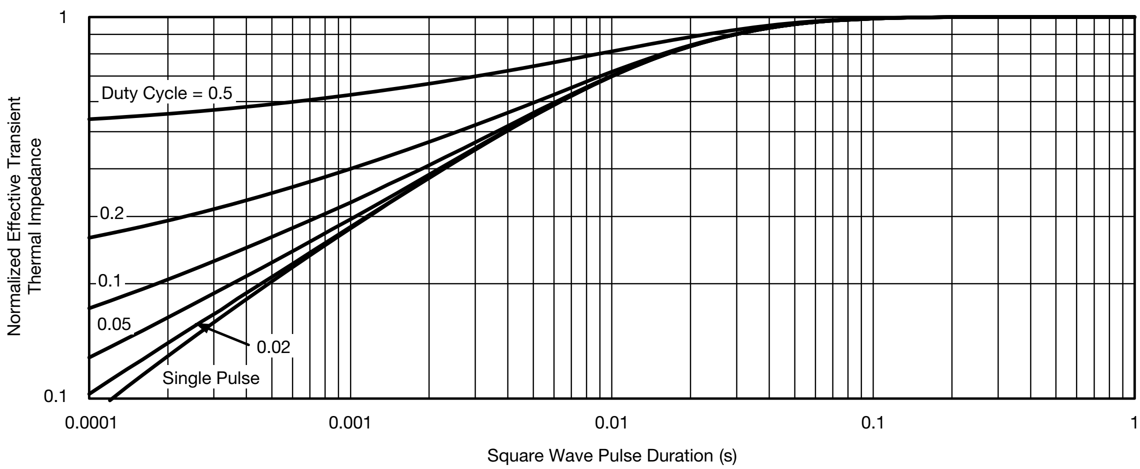
Note

a. The power dissipation P_D is based on T_J max. = 25 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

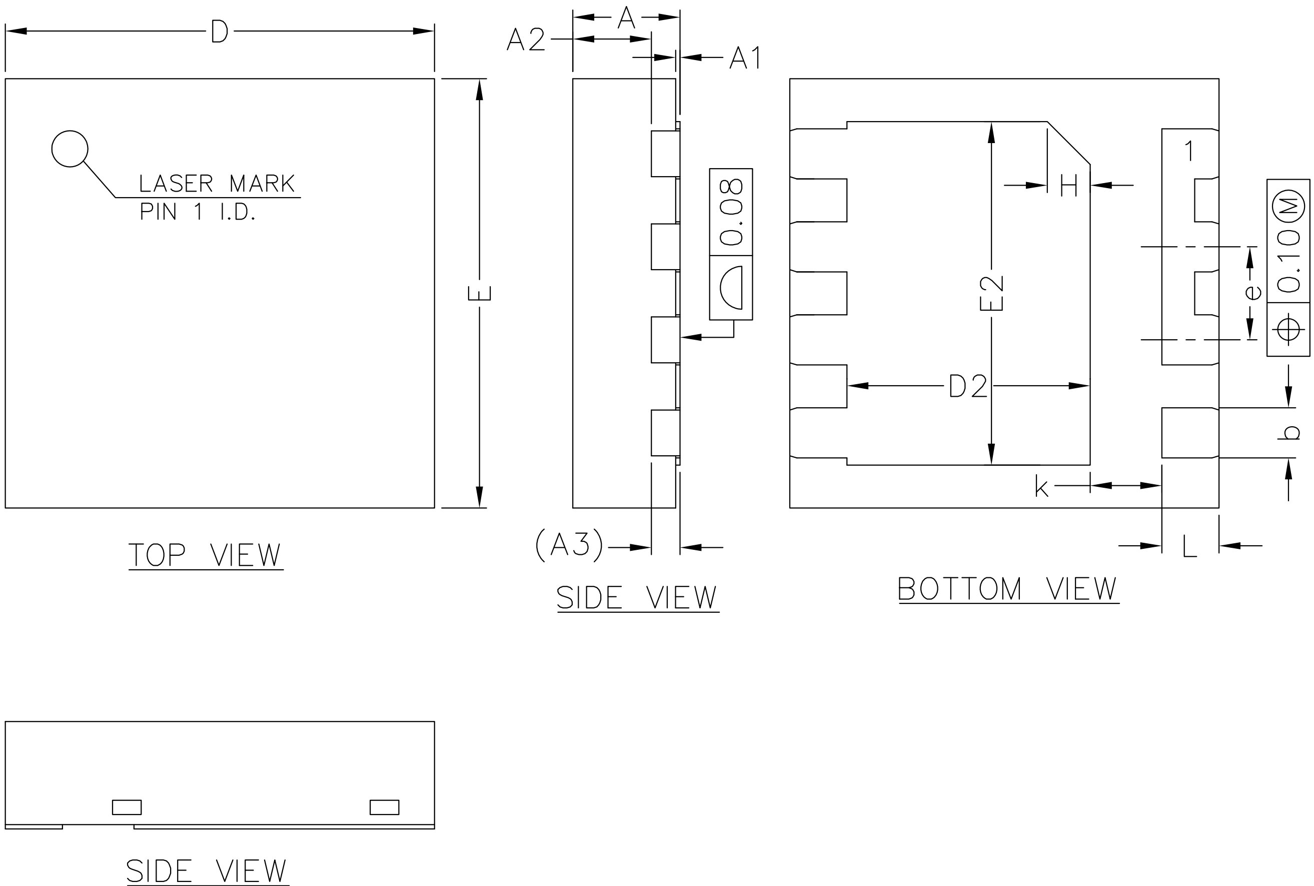
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.50	0.55	0.60
A3	0.20REF		
b	0.30	0.35	0.40
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	1.60	1.70	1.80
E2	2.30	2.40	2.50
e	0.55	0.65	0.75
K	0.40	0.50	0.60
L	0.35	0.40	0.45

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