

# P-Channel 80 V (D-S) MOSFET

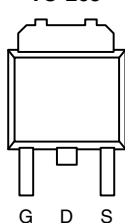
## PRODUCT SUMMARY

V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>b</sup>	Q <sub>g</sub> (Typ)
- 80	0.0112 at V <sub>GS</sub> = - 10 V	- 110	85 nC
	0.0145 at V <sub>GS</sub> = - 4.5 V	- 109	

## FEATURES

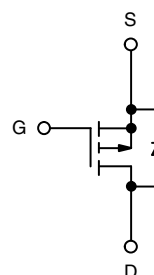
- TrenchFET® Power MOSFET
- Material categorization:  
For definitions of compliance please see  
[www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

**TO-263**


Top View

Drain Connected to Tab

**Ordering Information:** SUM110P08-11L-E3 (Lead (Pb)-free)


P-Channel MOSFET

## ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V <sub>DS</sub>	- 80	V
Gate-Source Voltage		V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 175 °C)	T <sub>C</sub> = 25 °C	I <sub>D</sub>	- 110 <sup>a</sup>	A
	T <sub>C</sub> = 125 °C		- 71	
	T <sub>A</sub> = 25 °C		- 23.5 <sup>b, c</sup>	
	T <sub>A</sub> = 125 °C		- 13.6 <sup>b, c</sup>	
Pulsed Drain Current		I <sub>DM</sub>	- 120	
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	I <sub>S</sub>	- 110	
	T <sub>A</sub> = 25 °C		- 9 <sup>b, c</sup>	
Avalanche Current	L = 0.1 mH	I <sub>AS</sub>	- 75	mJ
Single-Pulse Avalanche Energy		E <sub>AS</sub>	281	
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	P <sub>D</sub>	375	W
	T <sub>C</sub> = 125 °C		125	
	T <sub>A</sub> = 25 °C		13.6 <sup>b, c</sup>	
	T <sub>A</sub> = 125 °C		4.5 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range		T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C

## THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	t ≤ 10 s	R <sub>thJA</sub>	8	11	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R <sub>thJC</sub>	0.33	0.4	

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 40 °C/W.

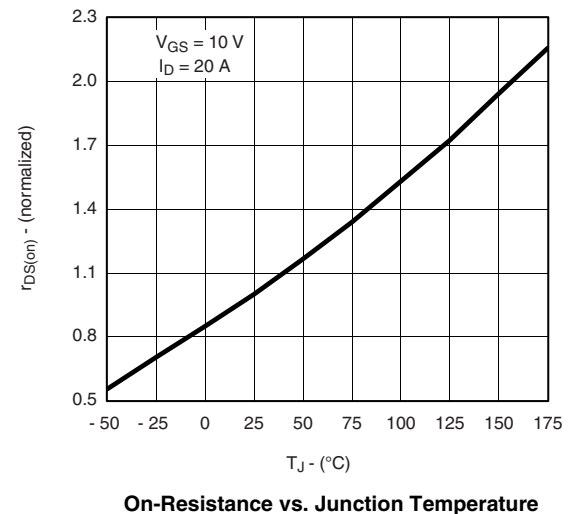
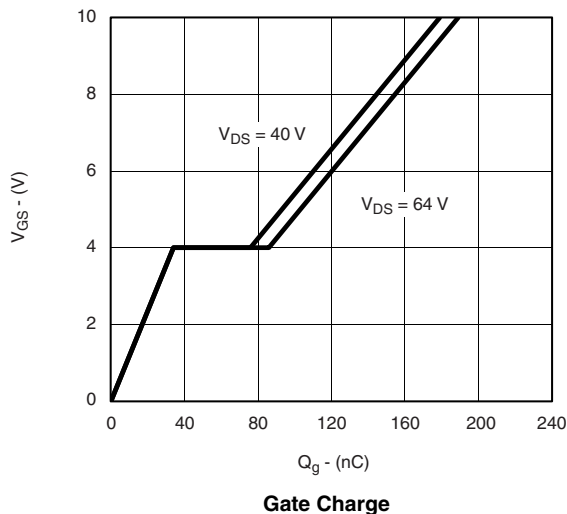
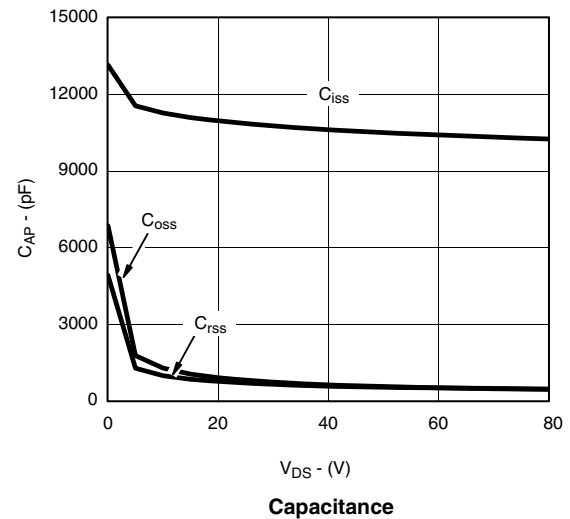
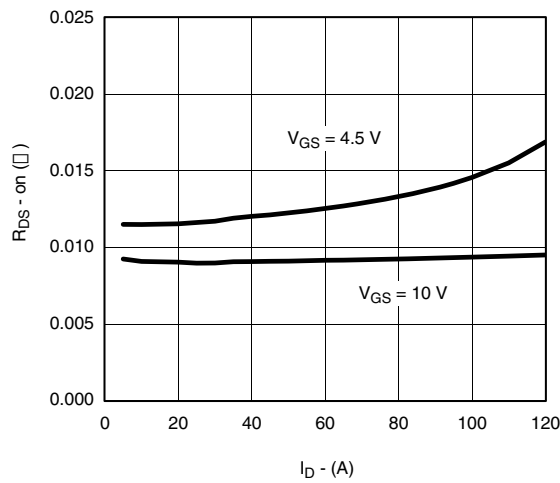
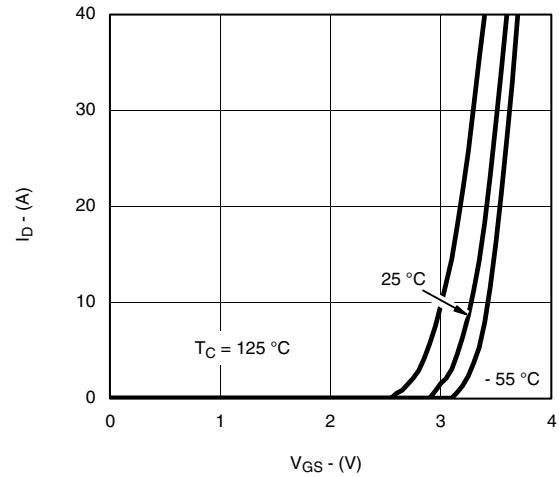
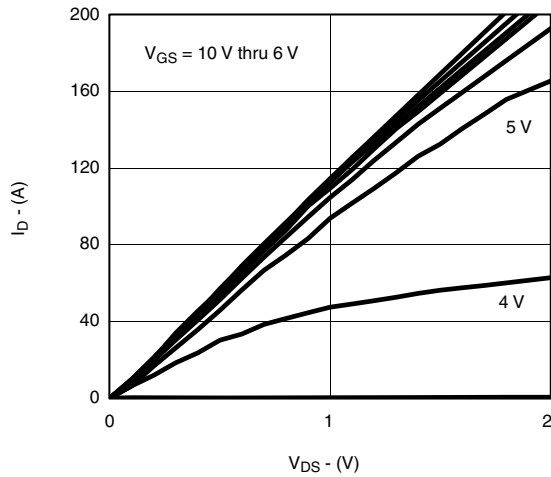
SPECIFICATIONS (T <sub>A</sub> = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = - 250 μA	- 80			V
V <sub>DS</sub> Temperature Coefficient	ΔV <sub>DS</sub> /T <sub>J</sub>	I <sub>D</sub> = - 1 μA		- 85		mV/°C
V <sub>GS(th)</sub> Temperature Coefficient	ΔV <sub>GS(th)</sub> /T <sub>J</sub>			- 5.5		
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = - 250 μA	- 1		- 3	V
Gate-Source Leakage	I <sub>GSS</sub>	V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = - 80 V, V <sub>GS</sub> = 0 V			- 1	μA
		V <sub>DS</sub> = - 80 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 175 °C			- 500	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> ≥ 10 V, V <sub>GS</sub> = - 10 V	- 120			A
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 20 A		0.0093	0.0112	Ω
		V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 15 A		0.0120	0.0145	
Forward Transconductance <sup>a</sup>	g <sub>fs</sub>	V <sub>DS</sub> = - 15 V, I <sub>D</sub> = - 20 A		85		S
Dynamic <sup>b</sup>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = - 40 V, V <sub>GS</sub> = 0 V, f = 1 MHz		10850		pF
Output Capacitance	C <sub>oss</sub>			800		
Reverse Transfer Capacitance	C <sub>rss</sub>			700		
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = - 40 V, V <sub>GS</sub> = - 10 V, I <sub>D</sub> = - 110 A		180	270	nC
		V <sub>DS</sub> = - 40 V, V <sub>GS</sub> = - 4.5 V, I <sub>D</sub> = - 110 A		85	130	
Gate-Source Charge	Q <sub>gs</sub>			35		
Gate-Drain Charge	Q <sub>gd</sub>			42		
Gate Resistance	R <sub>g</sub>	f = 1 MHz		3.6		Ω
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> = - 40 V, R <sub>L</sub> = 0.36 Ω I <sub>D</sub> ≅ - 110 A, V <sub>GEN</sub> = - 10 V, R <sub>g</sub> = 1 Ω		20	30	ns
Rise Time	t <sub>r</sub>			330	500	
Turn-Off Delay Time	t <sub>d(off)</sub>			135	205	
Fall Time	t <sub>f</sub>			550	825	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I <sub>S</sub>	T <sub>C</sub> = 25 °C			- 110	A
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				- 120	
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = - 20 A		- 0.8	- 1.5	V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = - 20 A, di/dt = 100 A/μs, T <sub>J</sub> = 25 °C		65	100	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			135	205	nC
Reverse Recovery Fall Time	t <sub>a</sub>			43		ns
Reverse Recovery Rise Time	t <sub>b</sub>			22		

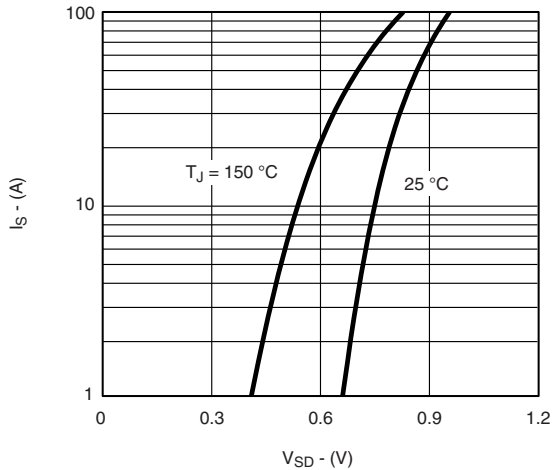
Notes:

a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

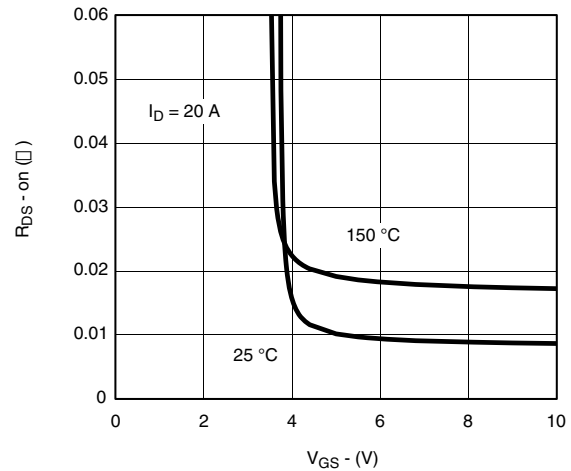
b. Guaranteed by design, not subject to production testing.

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.

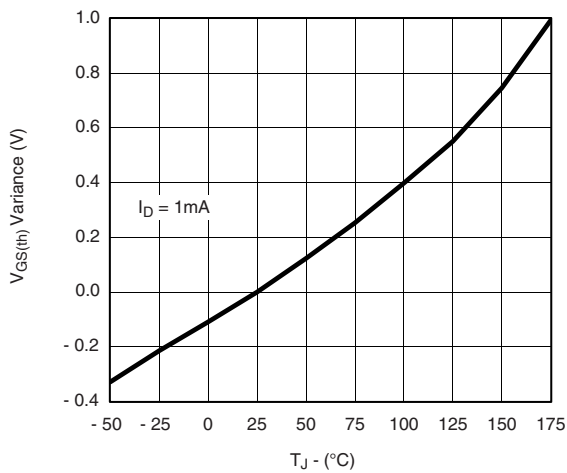
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

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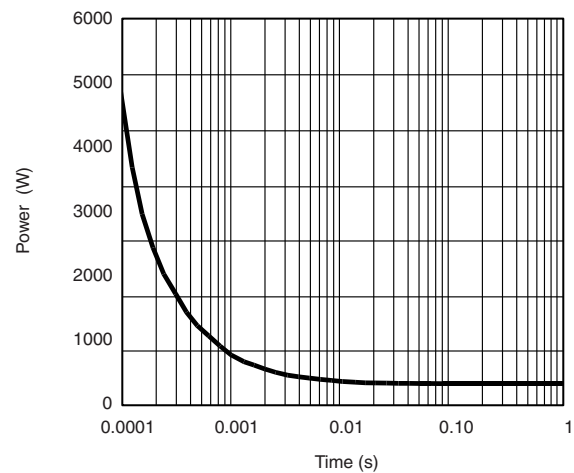
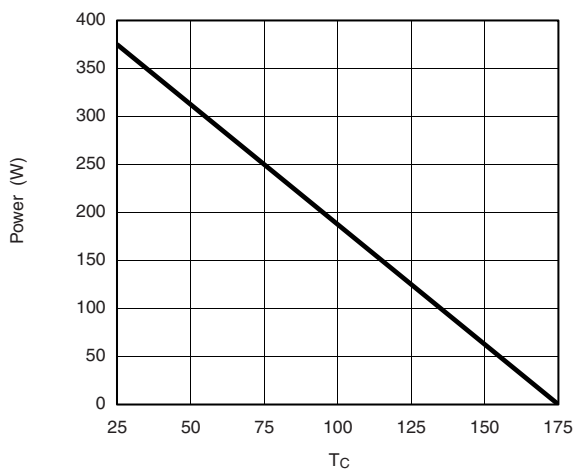
Source-Drain Diode Forward Voltage



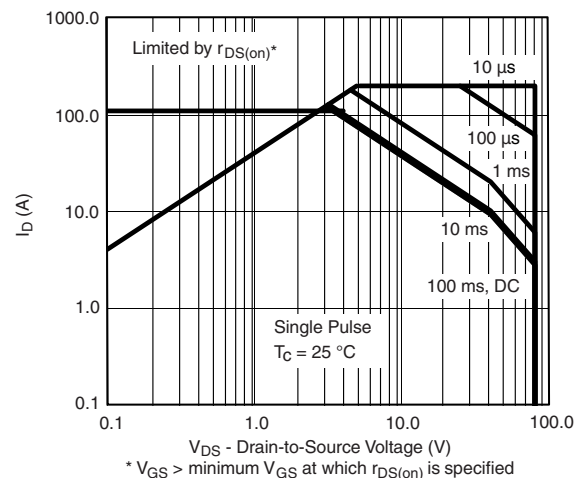
On-Resistance vs. Gate-to-Source Voltage



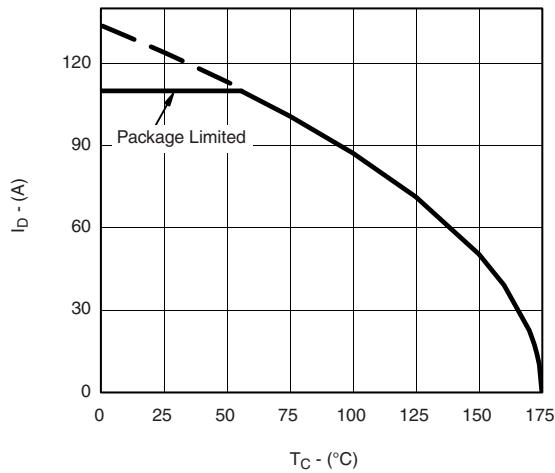
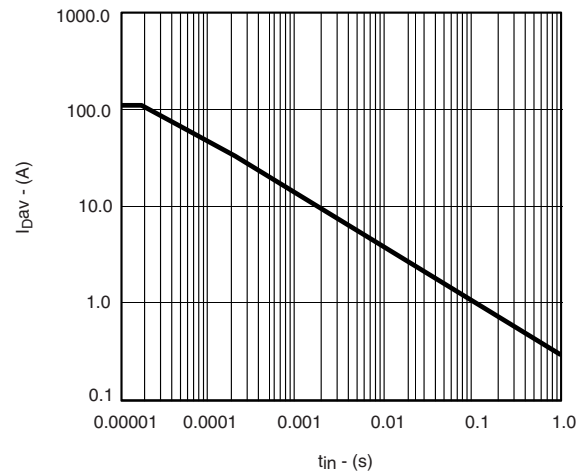
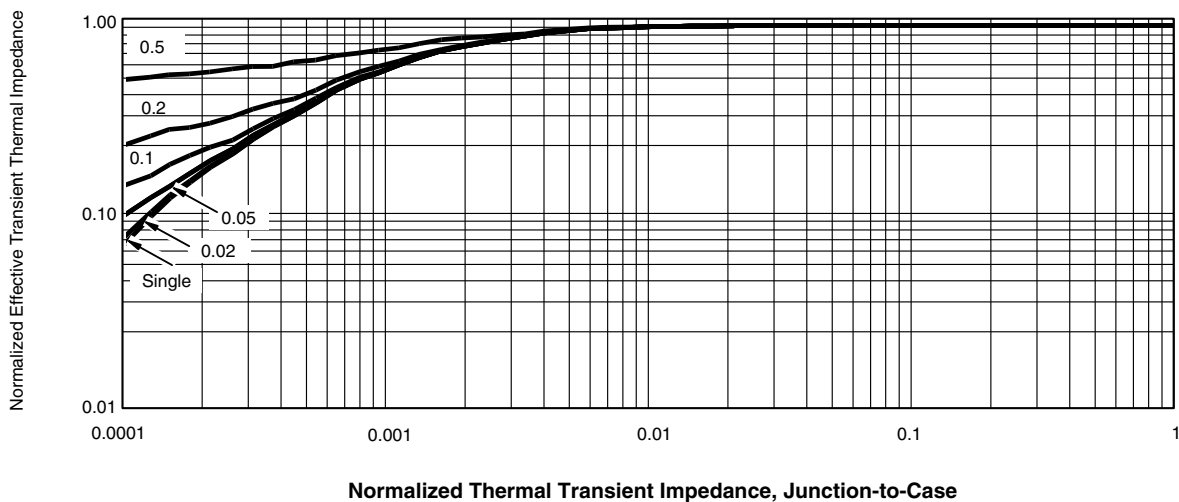
Threshold Voltage

Single Pulse Power, Junction-to-Case ( $T_C = 25^\circ\text{C}$ )

Power Derating, Junction-to-Case



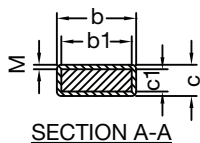
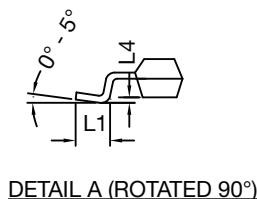
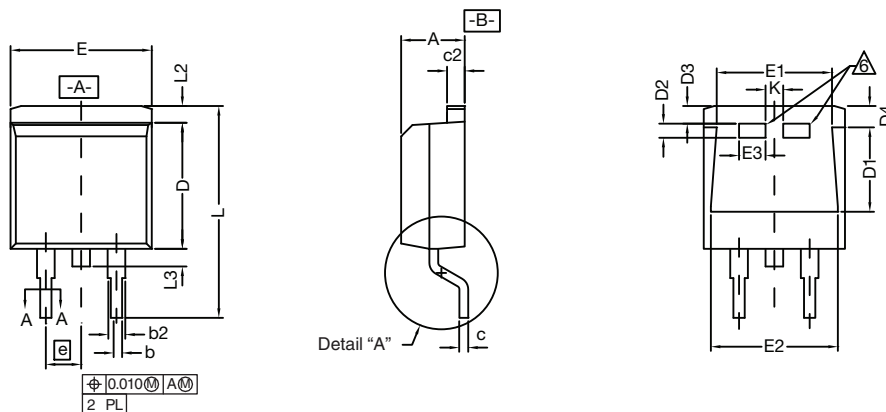
Safe Operating Area

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)**Max. Avalanche and Drain Current vs. Case Temperature****Avalanche Current vs. Time**

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
## TO-263 (D<sup>2</sup>PAK): 3-LEAD

### VERSION 1: FACILITY CODE = T



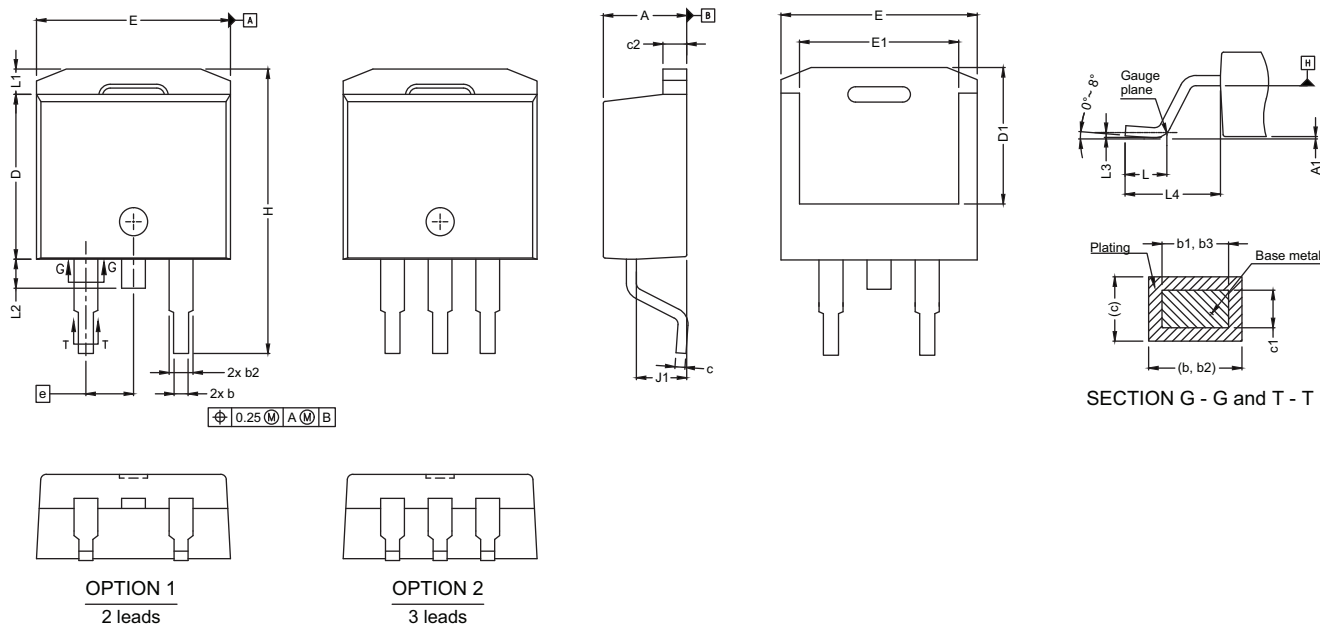
DIM.		INCHES		MILLIMETERS	
		MIN.	MAX.	MIN.	MAX.
A		0.160	0.190	4.064	4.826
b		0.020	0.039	0.508	0.990
b1		0.020	0.035	0.508	0.889
b2		0.045	0.055	1.143	1.397
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2		0.045	0.055	1.143	1.397
D		0.340	0.380	8.636	9.652
D1		0.220	0.240	5.588	6.096
D2		0.038	0.042	0.965	1.067
D3		0.045	0.055	1.143	1.397
D4		0.044	0.052	1.118	1.321
E		0.380	0.410	9.652	10.414
E1		0.245	-	6.223	-
E2		0.355	0.375	9.017	9.525
E3		0.072	0.078	1.829	1.981
e		0.100 BSC		2.54 BSC	
K		0.045	0.055	1.143	1.397
L		0.575	0.625	14.605	15.875
L1		0.090	0.110	2.286	2.794
L2		0.040	0.055	1.016	1.397
L3		0.050	0.070	1.270	1.778
L4		0.010 BSC		0.254 BSC	
M		-	0.002	-	0.050

#### Notes

- Plane B includes maximum features of heat sink tab and plastic.
- No more than 25 % of L1 can fall above seating plane by max. 8 mils.
- Pin-to-pin coplanarity max. 4 mils.
- \*: Thin lead is for SUB, SYB.  
Thick lead is for SUM, SYM, SQM.
- Use inches as the primary measurement.
-  This feature is for thick lead.



### VERSION 2: FACILITY CODE = N



DIM.	MIN.	MAX.
A	4.36	4.56
A1	0	0.25
b	0.70	0.90
b1	0.51	0.89
b2	1.20	1.46
b3	1.17	1.37
c	0.38	0.694
c1	0.38	0.534
c2	1.19	1.34
D	8.60	9.00
D1	6.9	7.5
E	10.15	10.55
E1	8.1	8.7
e	2.54 BSC	
H	15.0	15.6
L	1.9	2.5
L1	-	1.65
L2	-	1.78
L3	0.25 typ.	
L4	4.78	5.28
J1	2.56	2.96

ECN: S24-1080-Rev. L, 28-Oct-2024  
DWG: 5843

**RECOMMENDED MINIMUM PADS FOR D<sup>2</sup>PAK: 3-Lead**



Recommended Minimum Pads  
 Dimensions in Inches/(mm)

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