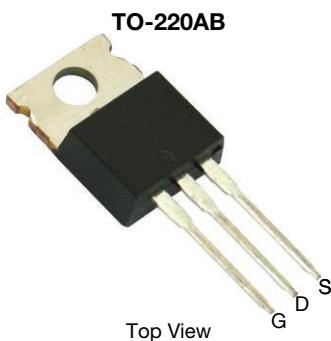


PSMN4R4-80PS,127-VB Datasheet

N-Channel 80 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) MAX.	I_D (A)	Q_g (TYP.)
80	0.0028 at $V_{GS} = 10$ V	195	94
	0.0030 at $V_{GS} = 7.5$ V	185	



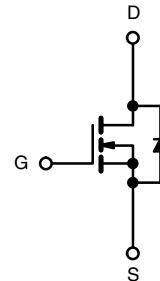
FEATURES

- Trench power MOSFET
- Maximum 175 °C junction temperature
- Very low Q_{gd} reduces power loss from passing through $V_{plateau}$
- 100 % R_g and UIS tested



APPLICATIONS

- Power supply
 - Secondary synchronous rectification
- DC/DC converter
- Power tools
- Motor drive switch
- DC/AC inverter
- Battery management



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)			
PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V_{DS}	80	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150$ °C)	$I_C = 25$ °C	195	A
	$T_C = 70$ °C	120 ^d	
Pulsed Drain Current ($t = 100$ μ s)	I_{DM}	600	
Avalanche Current	I_{AS}	70	
Single Avalanche Energy ^a	E_{AS}	245	mJ
Maximum Power Dissipation ^a	$T_C = 25$ °C	375 ^b	W
	$T_C = 125$ °C	125 ^b	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS			
PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^c	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	0.4	

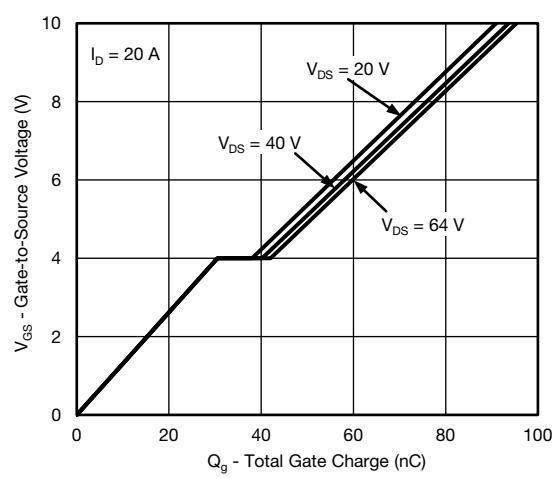
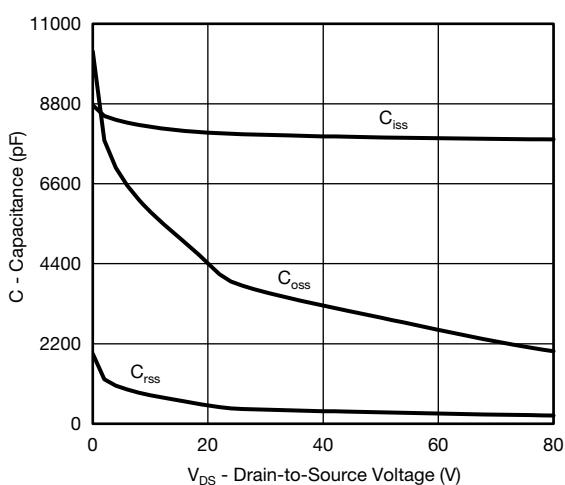
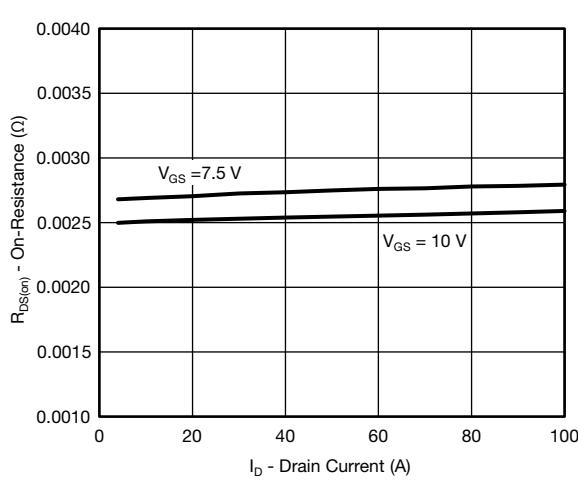
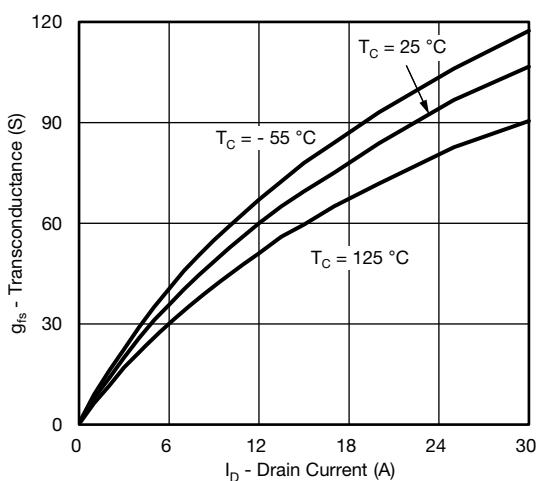
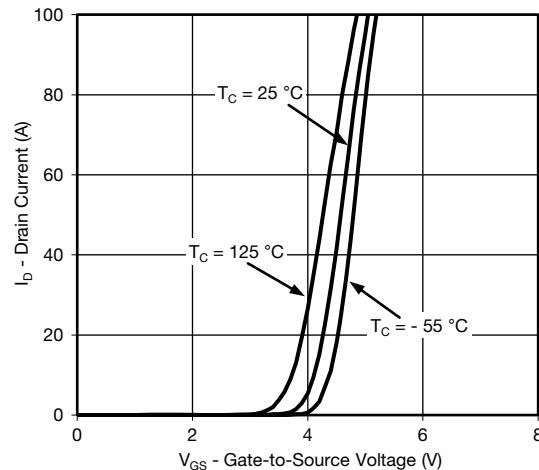
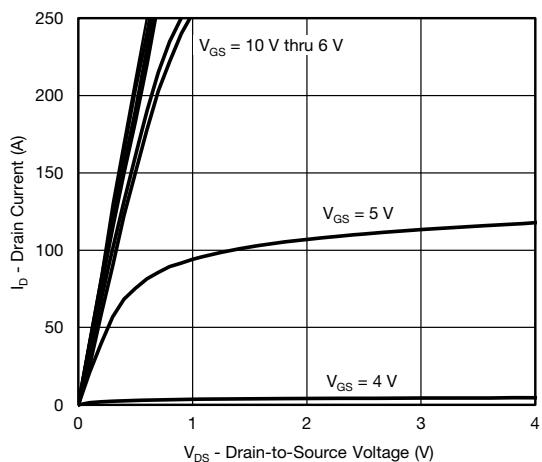
Notes

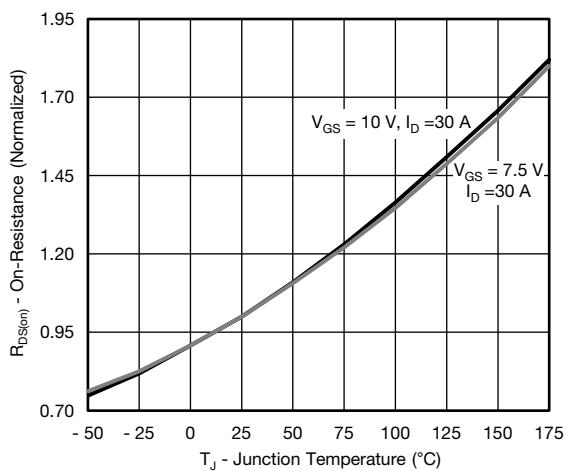
- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).
- Package limited.

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}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	80	-	-	V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	2	-	4	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$	-	-	± 250	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 80 \text{ V}$, $V_{GS} = 0 \text{ V}$	-	-	1	μA
		$V_{DS} = 80 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$	-	-	150	
		$V_{DS} = 80 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$	-	-	5	mA
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 10 \text{ V}$, $V_{GS} = 10 \text{ V}$	120	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 30 \text{ A}$	-	0.0028	-	Ω
		$V_{GS} = 7.5 \text{ V}$, $I_D = 20 \text{ A}$	-	0.0030	-	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 30 \text{ A}$	-	82	-	S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 40 \text{ V}$, $f = 1 \text{ MHz}$	-	7910	-	pF
Output Capacitance	C_{oss}		-	3250	-	
Reverse Transfer Capacitance	C_{rss}		-	348	-	
Total Gate Charge ^c	Q_g	$V_{DS} = 40 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$	-	94	141	nC
Gate-Source Charge ^c	Q_{gs}		-	31	-	
Gate-Drain Charge ^c	Q_{gd}		-	10	-	
Gate Resistance	R_g	$f = 1 \text{ MHz}$	0.28	1.4	2.8	Ω
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 40 \text{ V}$, $R_L = 4 \Omega$ $I_D \geq 10 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$	-	24	40	ns
Rise Time ^c	t_r		-	24	40	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$		-	34	60	
Fall Time ^c	t_f		-	14	28	
Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25^\circ\text{C}$)						
Pulsed Current ($t = 100 \mu\text{s}$)	I_{SM}	$I_F = 10 \text{ A}$, $V_{GS} = 0 \text{ V}$ $I_F = 34 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$	-	-	250	A
Forward Voltage ^a	V_{SD}		-	0.8	1.5	V
Reverse Recovery Time	t_{rr}		-	126	190	ns
Peak Reverse Recovery Charge	$I_{RM(\text{REC})}$		-	5	10	A
Reverse Recovery Charge	Q_{rr}		-	0.315	0.475	μC

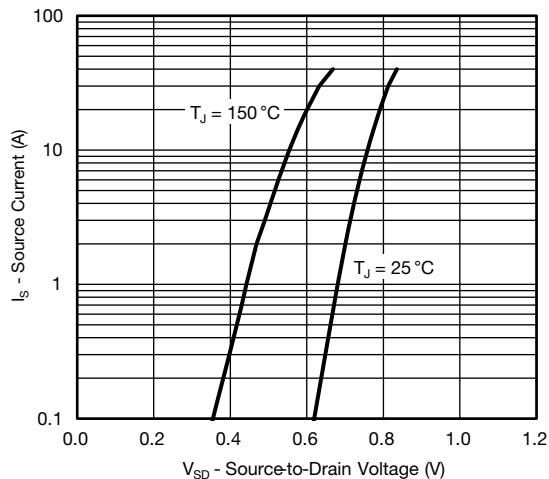
Notes

- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

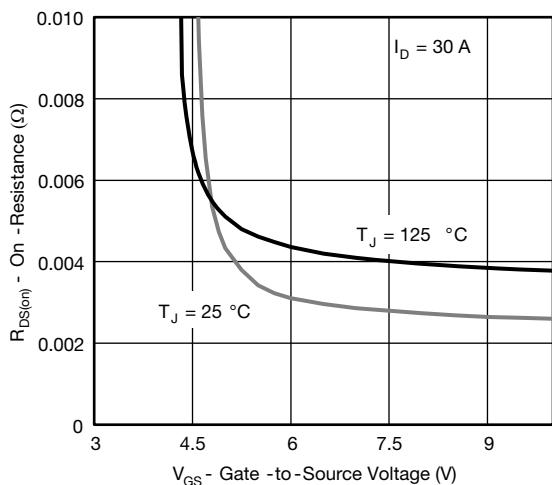
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)


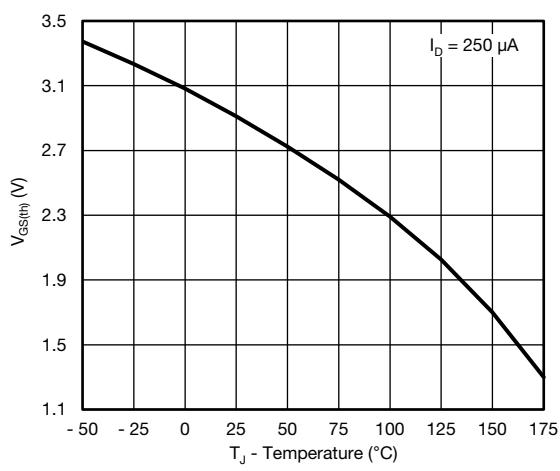
On-Resistance vs. Junction Temperature



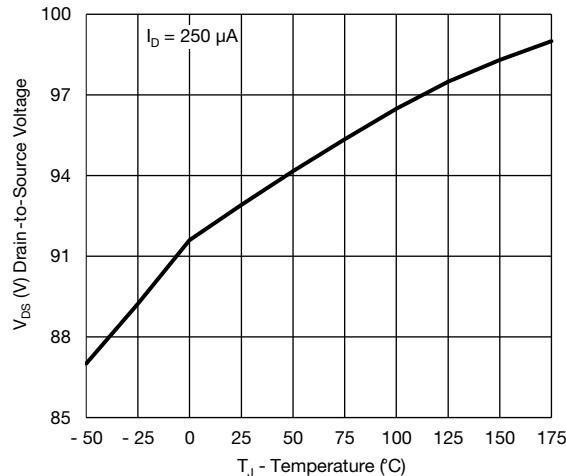
Source Drain Diode Forward Voltage



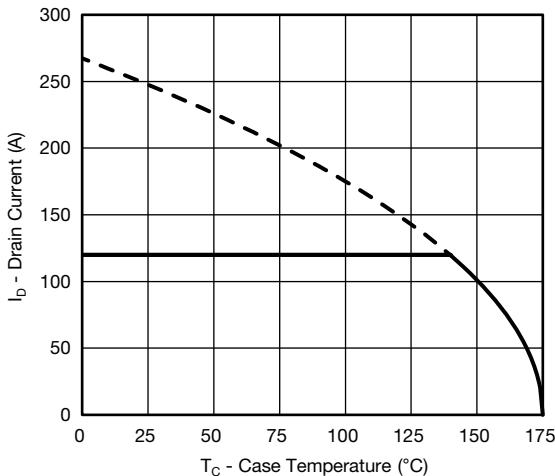
On-Resistance vs. Gate-to-Source Voltage



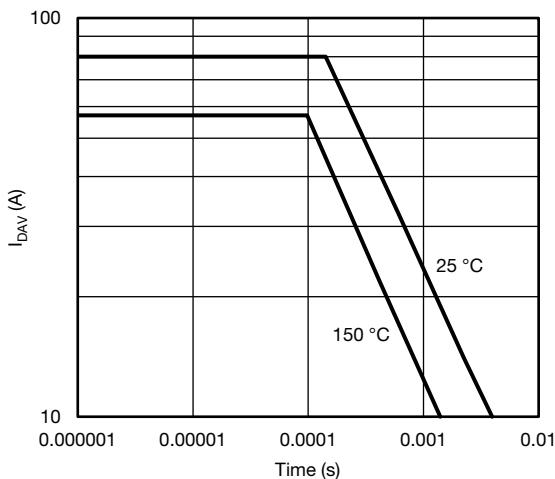
Threshold Voltage



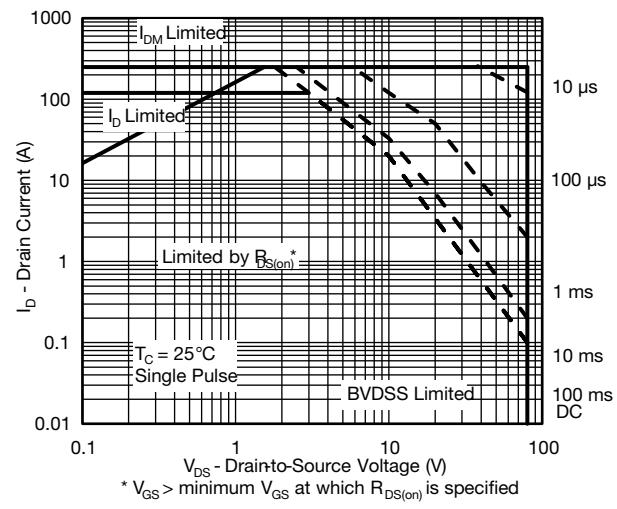
Drain Source Breakdown vs. Junction Temperature



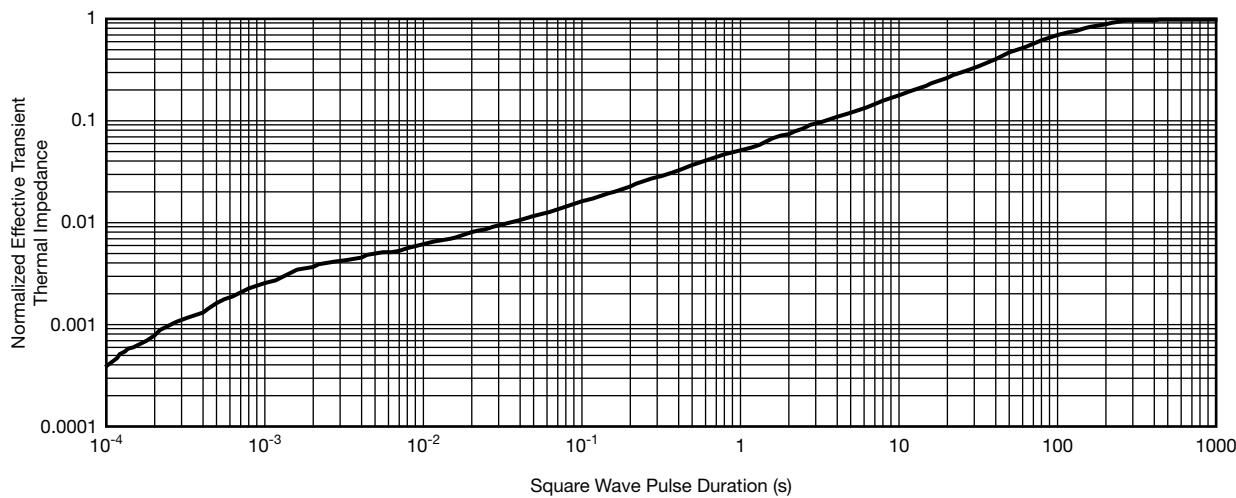
Current De-rating

THERMAL RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)


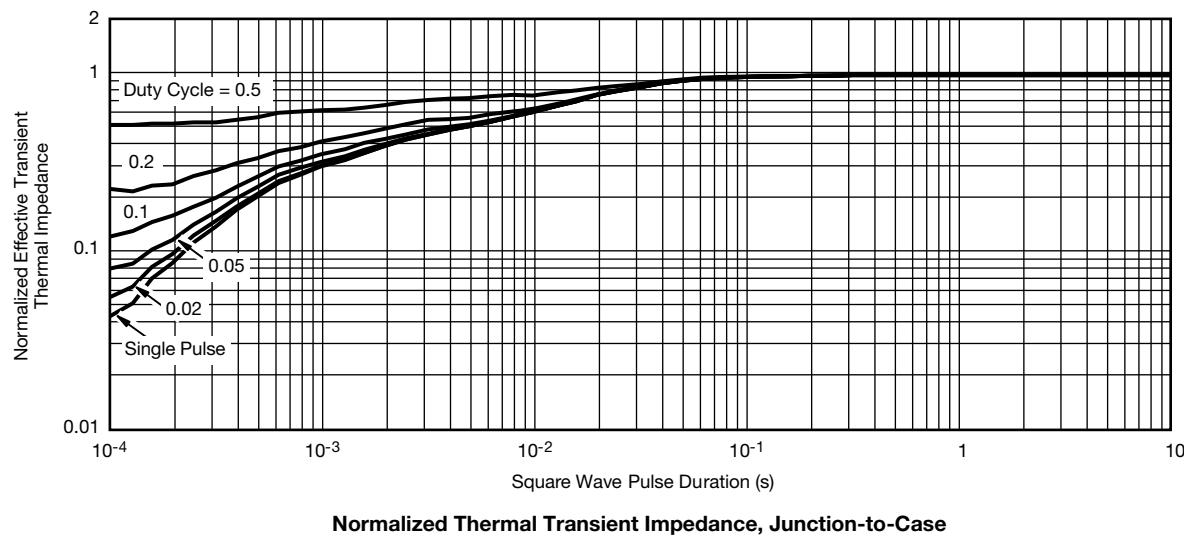
Single Pulse Avalanche Current Capability vs. Time



Safe Operating Area



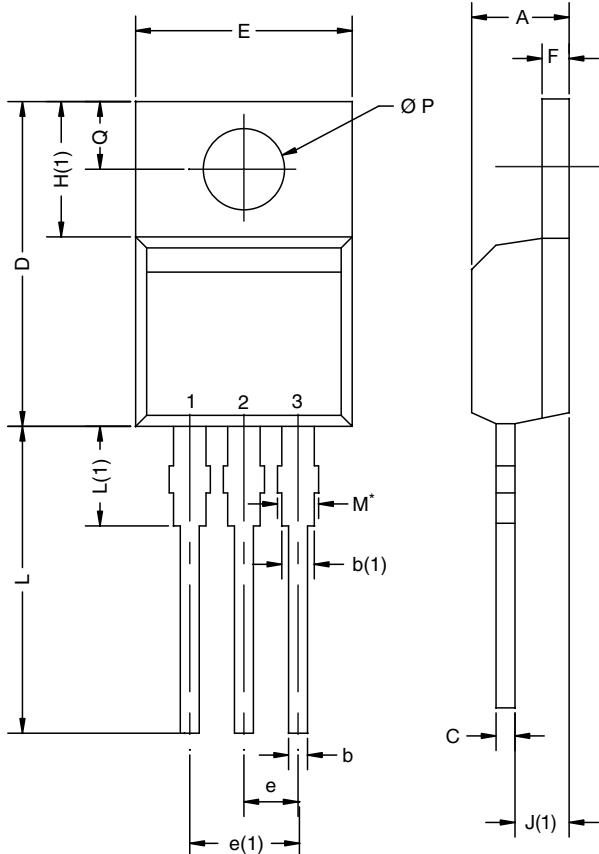
Normalized Thermal Transient Impedance, Junction-to-Ambient

THERMAL RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

Normalized Thermal Transient Impedance, Junction-to-Case
Note

- The characteristics shown in the two graphs
 - Normalized Transient Thermal Impedance Junction to Ambient (25°C)
 - Normalized Transient Thermal Impedance Junction to Case (25°C)

are given for general guidelines only to enable the user to get a “ball park” indication of part capabilities. The data are extracted from single pulse transient thermal impedance characteristics which are developed from empirical measurements. The latter is valid for the part mounted on printed circuit board - FR4, size 1" x 1" x 0.062", double sided with 2 oz. copper, 100 % on both sides. The part capabilities can widely vary depending on actual application parameters and operating conditions.

TO-220AB



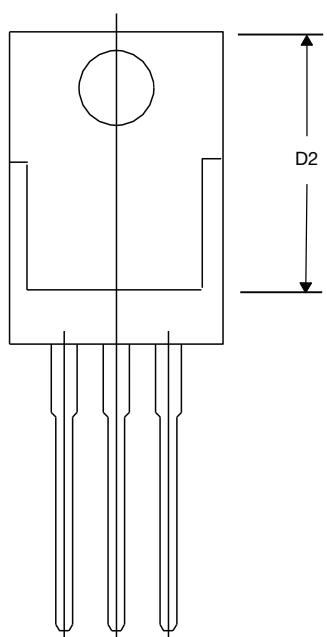
DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118

ECN: T14-0413-Rev. P, 16-Jun-14

DWG: 5471

Note

* M = 1.32 mm to 1.62 mm (dimension including protrusion)
 Heatsink hole for HVM



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