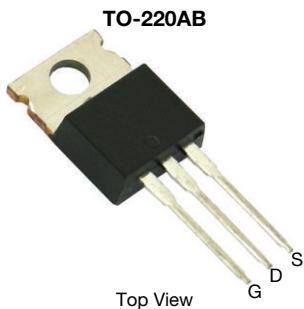


N-Channel 200 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) MAX.	I _D (A)	Q _g (TYP.)
200	0.017 at V _{GS} = 10 V	80	64 nC
	0.018 at V _{GS} = 7.5 V	78	

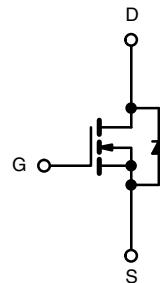
FEATURES

- ThunderFET® power MOSFET
- Maximum 175 °C junction temperature
- 100 % R_g and UIS tested



APPLICATIONS

- Power supplies:
 - Uninterruptible power supplies
 - AC/DC switch-mode power supplies
 - Lighting
- Synchronous rectification
- DC/DC converter
- Motor drive switch
- DC/AC inverter
- Solar micro inverter
- Class D audio amplifier



ABSOLUTE MAXIMUM RATINGS (T _C = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}		200	V
Gate-Source Voltage		V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	80	A
	T _C = 70 °C		65	
Pulsed Drain Current (t = 100 μs)	I _{DM}		240	
Avalanche Current		I _{AS}	60	
Single Avalanche Energy ^a	L = 0.1 mH	E _{AS}	180	mJ
Maximum Power Dissipation ^a		P _D	375 ^b	
T _C = 25 °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	

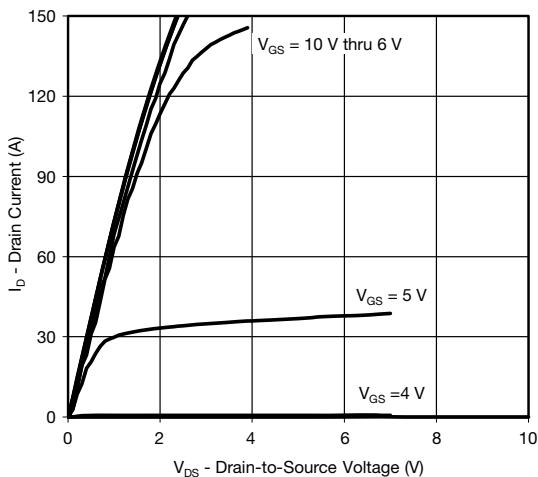
Notes

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

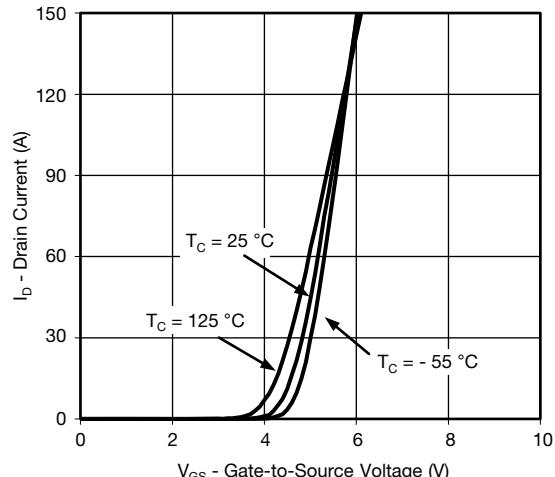
SPECIFICATIONS ($T_J = 25^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	200	-	-	V
Gate Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	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}	$V_{DS} = 200 \text{ V}$, $V_{GS} = 0 \text{ V}$	-	-	1	μA
		$V_{DS} = 200 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 125^\circ\text{C}$	-	-	150	
		$V_{DS} = 200 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 175^\circ\text{C}$	-	-	5	mA
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 10 \text{ V}$, $V_{GS} = 10 \text{ V}$	90	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 30 \text{ A}$	-	0.017	-	Ω
		$V_{GS} = 7.5 \text{ V}$, $I_D = 30 \text{ A}$	-	0.018	-	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 30 \text{ A}$	-	75	-	S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0 \text{ V}$, $V_{DS} = 100 \text{ V}$, $f = 1 \text{ MHz}$	-	4132	-	pF
Output Capacitance	C_{oss}		-	246	-	
Reverse Transfer Capacitance	C_{rss}		-	21	-	
Total Gate Charge ^c	Q_g	$V_{DS} = 100 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 60 \text{ A}$	-	64	96	nC
Gate-Source Charge ^c	Q_{gs}		-	16.7	-	
Gate-Drain Charge ^c	Q_{gd}		-	16.9	-	
Gate Resistance	R_g	$f = 1 \text{ MHz}$	1.5	3	5	Ω
Turn-On Delay Time ^c	$t_{d(\text{on})}$	$V_{DD} = 100 \text{ V}$, $R_L = 1.66 \Omega$ $I_D \geq 60 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$	-	13	26	ns
Rise Time ^c	t_r		-	112	200	
Turn-Off Delay Time ^c	$t_{d(\text{off})}$		-	35	70	
Fall Time ^c	t_f		-	80	150	
Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25^\circ\text{C}$)						
Pulsed Current ($t = 100 \mu\text{s}$)	I_{SM}		-	-	240	A
Forward Voltage ^a	V_{SD}	$I_F = 10 \text{ A}$, $V_{GS} = 0 \text{ V}$	-	0.8	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 30 \text{ A}$, $\text{di}/\text{dt} = 100 \text{ A}/\mu\text{s}$	-	160	320	ns
Peak Reverse Recovery Charge	$I_{RM(\text{REC})}$		-	11	20	A
Reverse Recovery Charge	Q_{rr}		-	0.9	1.8	μC

Notes

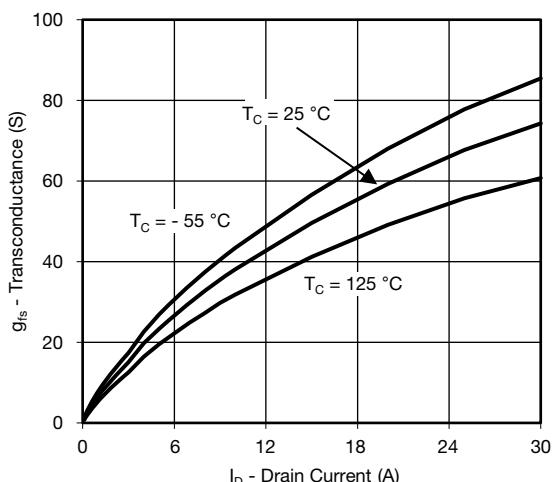
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2 \%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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


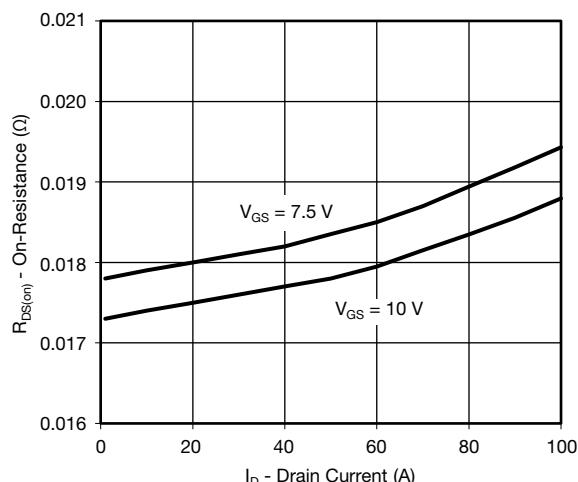
Output Characteristics



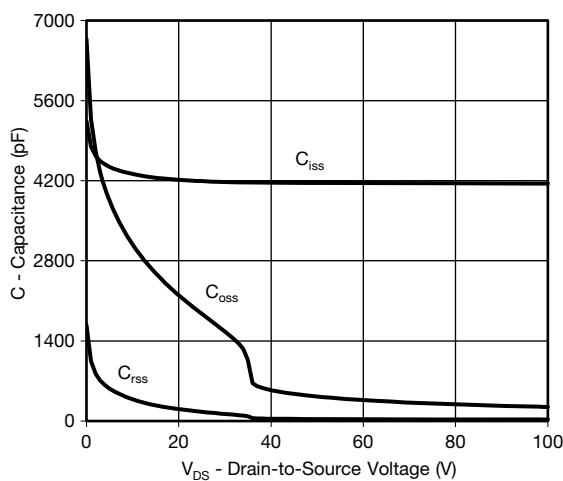
Transfer Characteristics



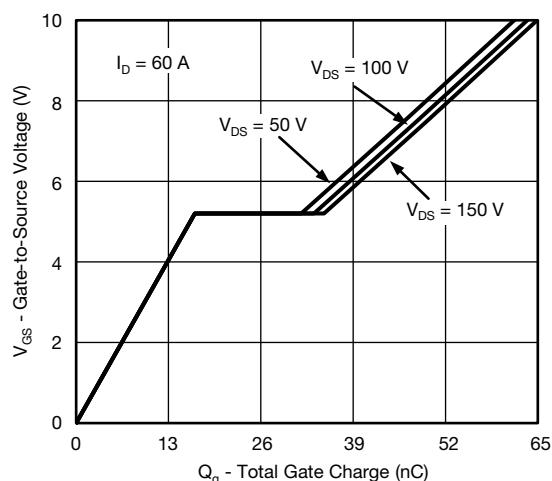
Transconductance



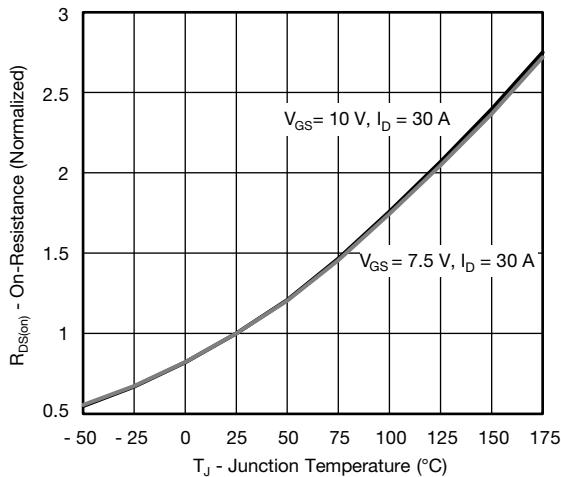
On-Resistance vs. Drain Current



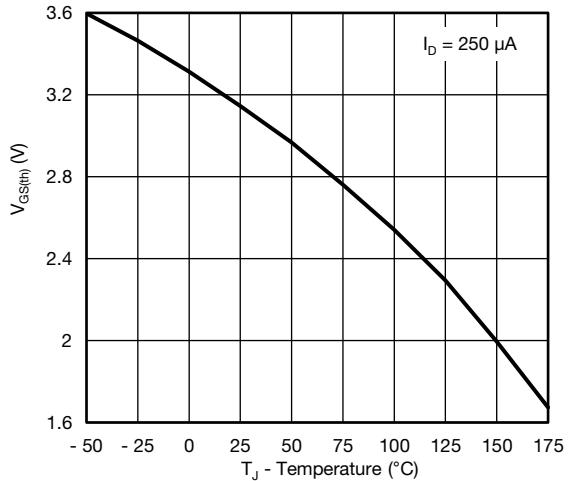
Capacitance



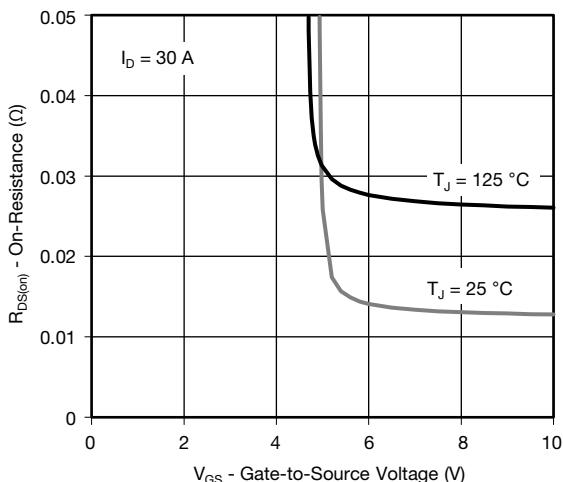
Gate Charge

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


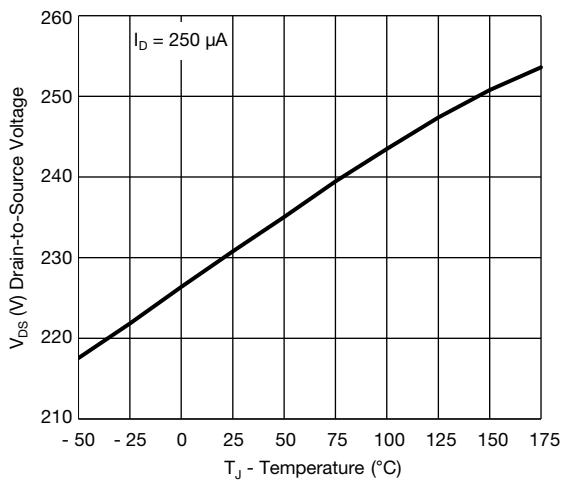
On-Resistance vs. Junction Temperature



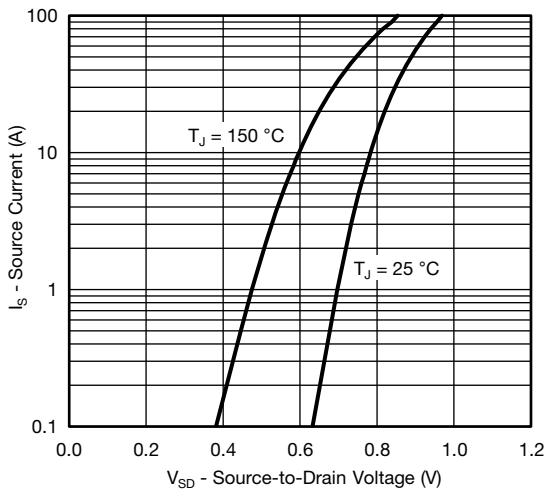
Threshold Voltage



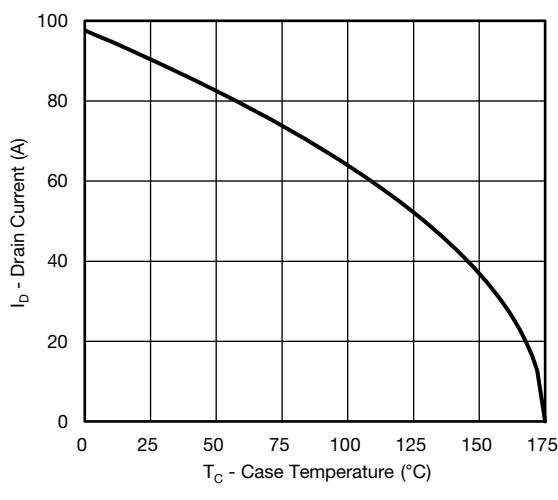
On-Resistance vs. Gate-to-Source Voltage



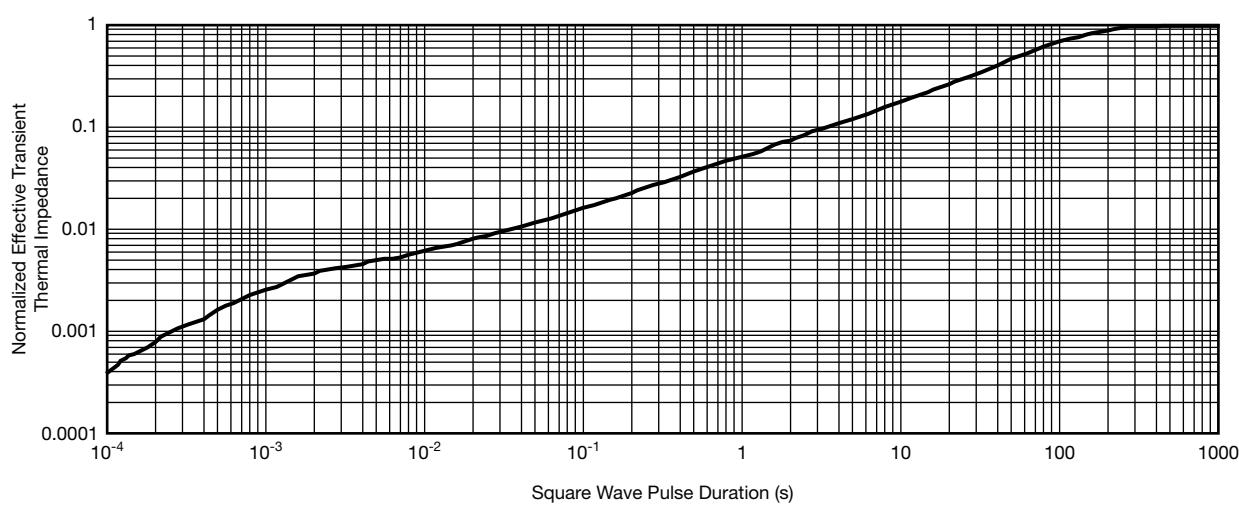
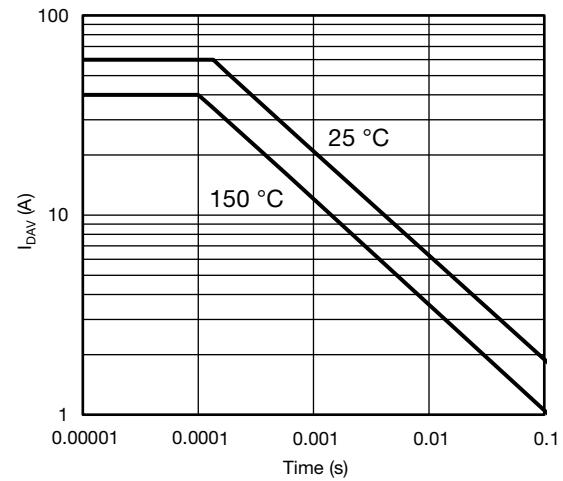
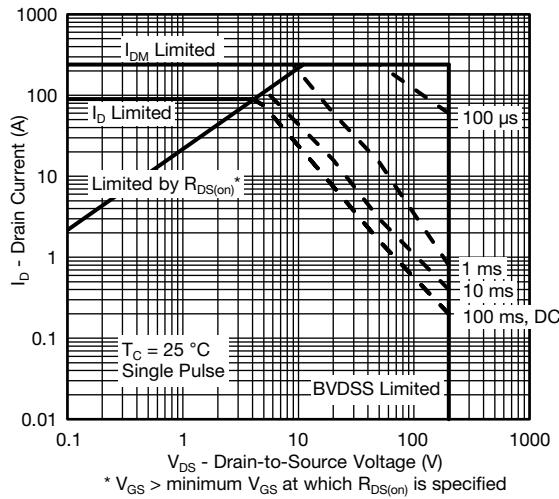
Drain Source Breakdown vs. Junction Temperature

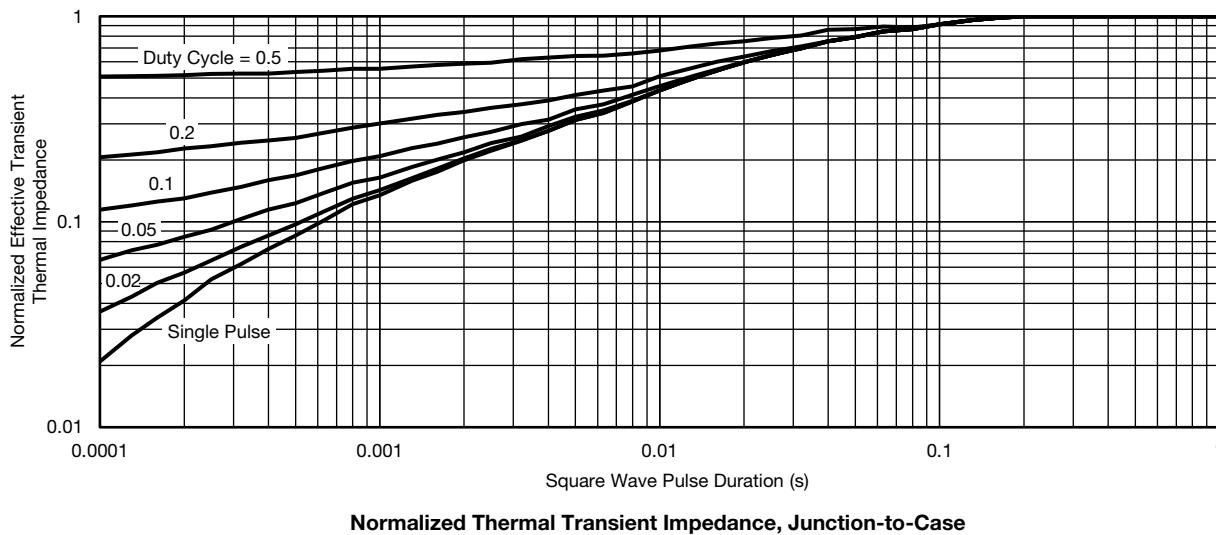


Source Drain Diode Forward Voltage



Current De-rating

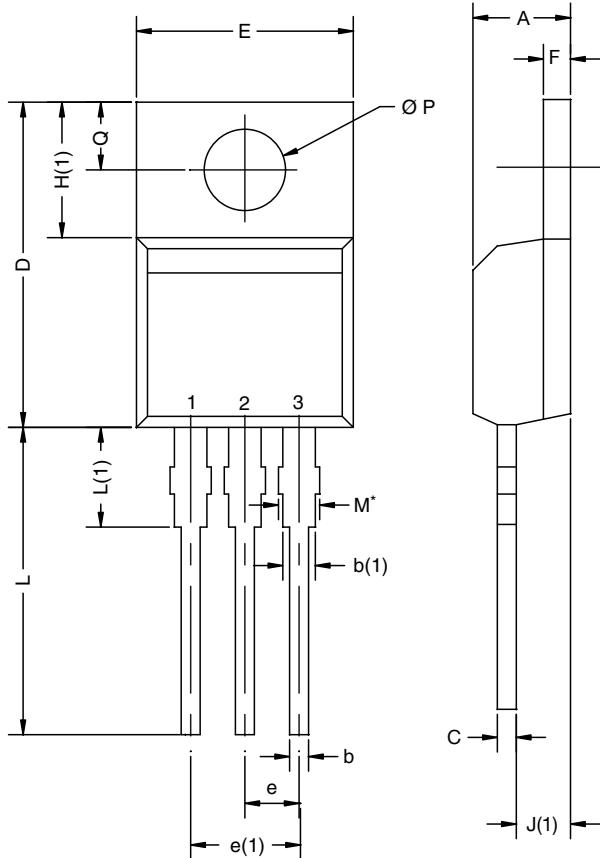
THERMAL RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)


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

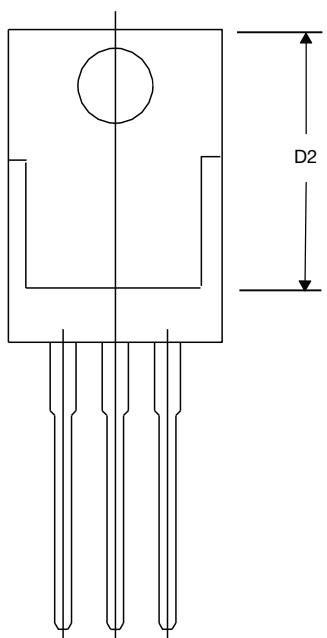


DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	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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