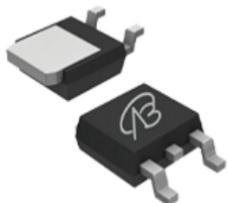


VBE1308 Datasheet

N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A) ^{a, c}	Q_g (Typ.)
30	0.007 at $V_{GS} = 10$ V	70	60 nC
	0.009 at $V_{GS} = 4.5$ V	65	

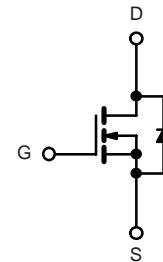
TO-252

**FEATURES**

- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested

**APPLICATIONS**

- Synchronous Rectification
- Power Supplies



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 ($T_J = 175$ °C)	I_D	70 ^{a, c}		A
		56 ^c		
		59 ^b		
		53 ^b		
Pulsed Drain Current	I_{DM}	210		
Avalanche Current Pulse	I_{AS}	80		
Single Pulse Avalanche Energy	E_{AS}	310		
Continuous Source-Drain Diode Current	I_S	110 ^{a, c}		
		2.6 ^b		A
Maximum Power Dissipation	P_D	312 ^a		
		200		
		3.13 ^b		
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	R_{thJA}	32	40	°C/W
Maximum Junction-to-Case	R_{thJC}	0.33	0.4	

Notes:

a. Based on $T_C = 25$ °C.

b. Surface Mounted on 1" x 1" FR4 board.

c. Calculated based on maximum junction temperature. Package limitation current is 110 A.

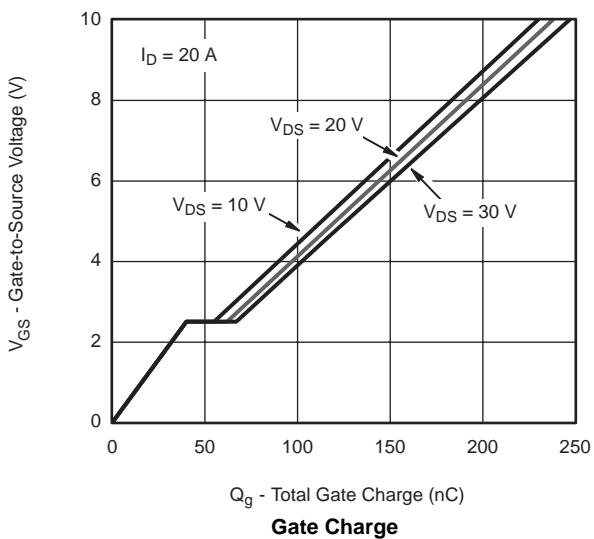
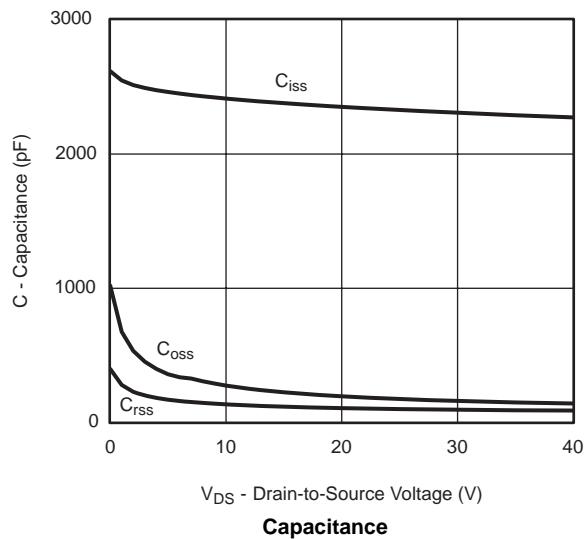
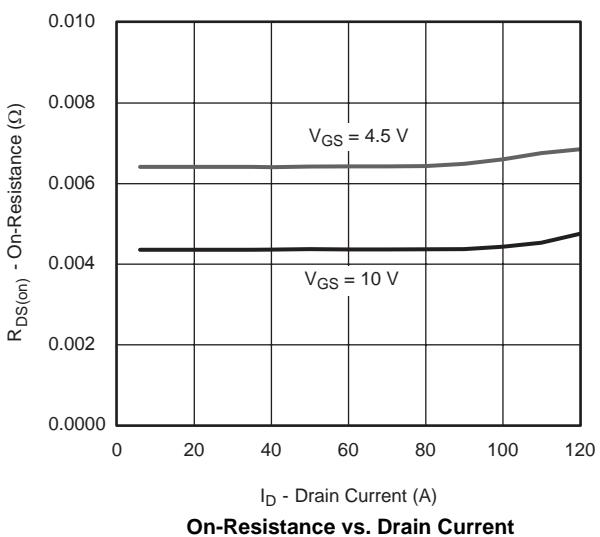
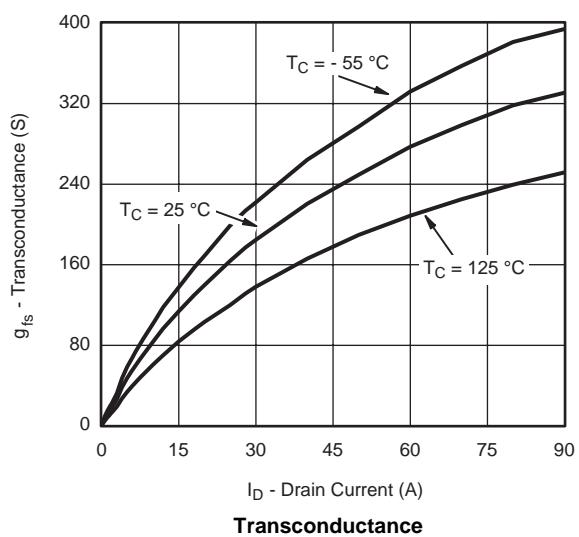
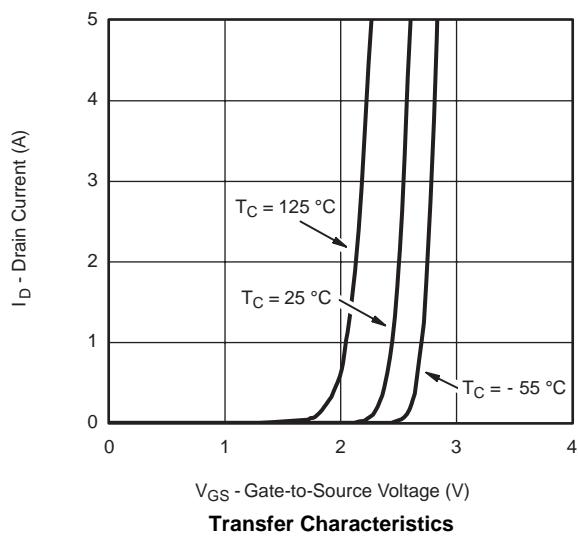
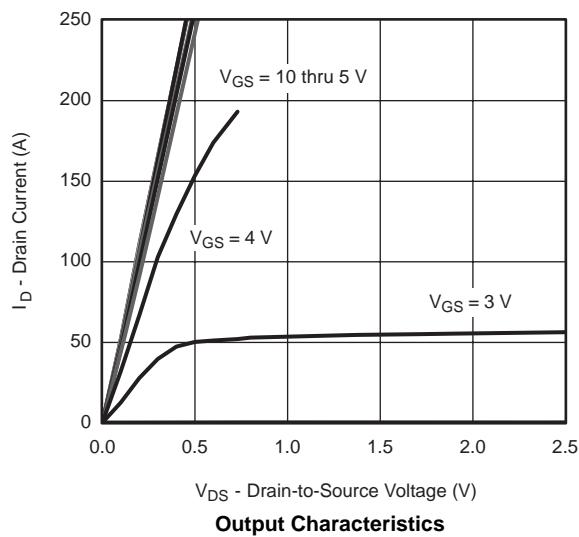
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

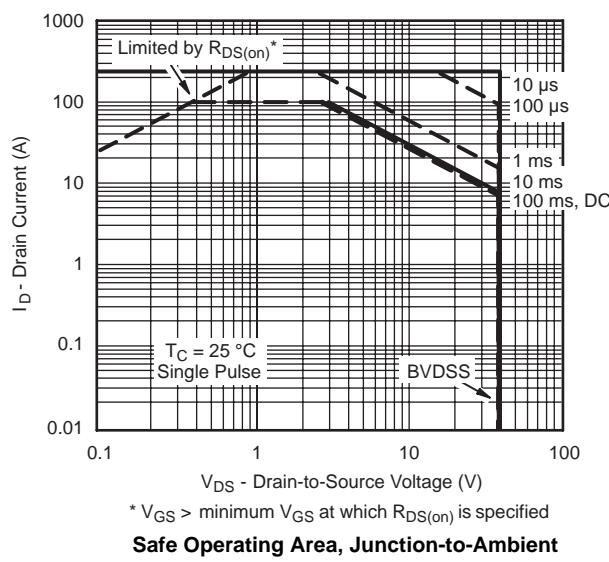
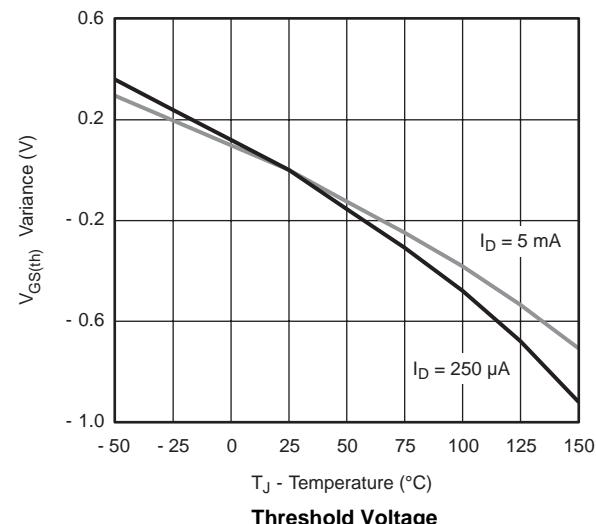
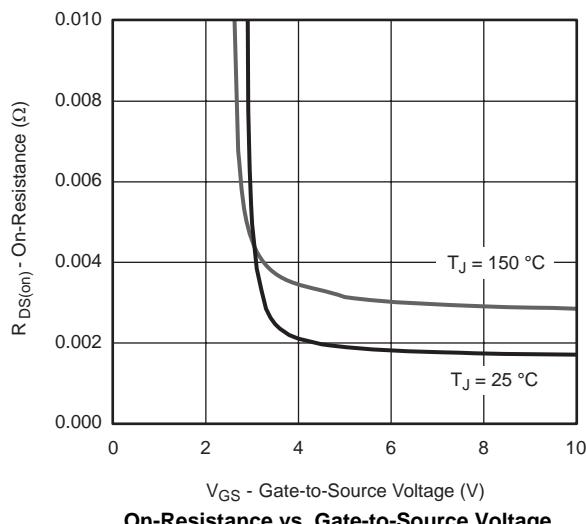
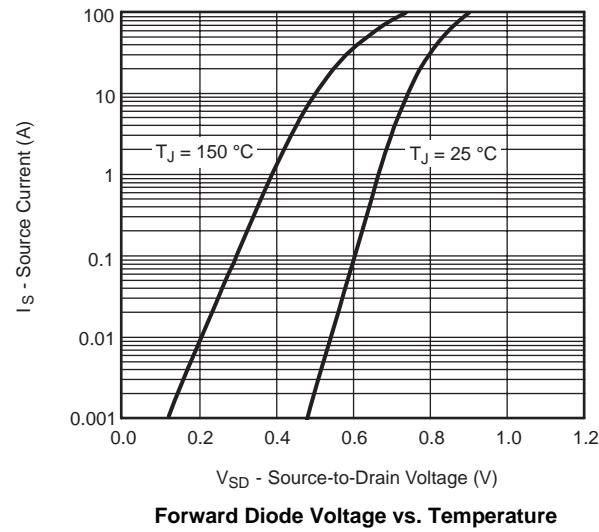
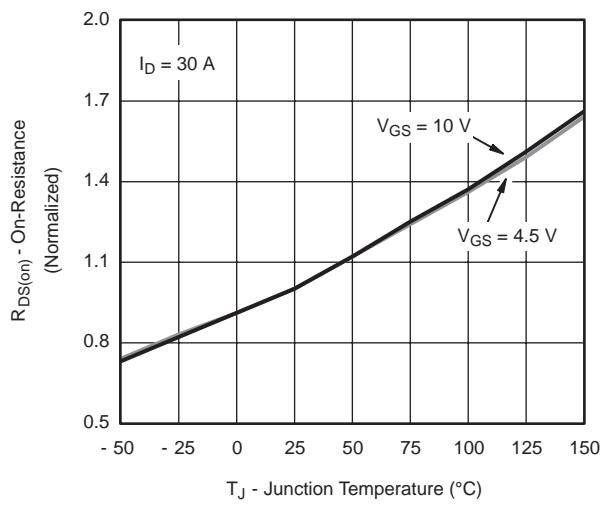
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250 \mu\text{A}$		41		$\text{mV}/^\circ\text{C}$
$V_{GS(\text{th})}$ Temperature Coefficient	$\Delta V_{GS(\text{th})}/T_J$			-8		
Gate-Source Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	1.2		2.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0 \text{ V}$, $V_{GS} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24 \text{ V}$, $V_{GS} = 0 \text{ V}$		1		μA
		$V_{DS} = 24 \text{ V}$, $V_{GS} = 0 \text{ V}$, $T_J = 55^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}$, $V_{GS} = 10 \text{ V}$	120			A
Drain-Source On-State Resistance ^a	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}$, $I_D = 30 \text{ A}$		0.007		Ω
		$V_{GS} = 4.5 \text{ V}$, $I_D = 20 \text{ A}$		0.009		
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 \text{ V}$, $I_D = 30 \text{ A}$		160		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 20 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$		2200		pF
Output Capacitance	C_{oss}			550		
Reverse Transfer Capacitance	C_{rss}			250		
Total Gate Charge	Q_g	$V_{DS} = 20 \text{ V}$, $V_{GS} = 10 \text{ V}$, $I_D = 20 \text{ A}$		80	120	nC
Gate-Source Charge	Q_{gs}			20		
Gate-Drain Charge	Q_{gd}			12		
Gate Resistance	R_g	$f = 1 \text{ MHz}$		0.85	1.3	Ω
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 20 \text{ V}$, $R_L = 1.0 \Omega$ $I_D \geq 20 \text{ A}$, $V_{GEN} = 10 \text{ V}$, $R_g = 1 \Omega$		20	30	ns
Rise Time	t_r			11	17	
Turn-Off Delay Time	$t_{d(\text{off})}$			77	115	
Fall Time	t_f			10	15	
Turn-On Delay Time	$t_{d(\text{on})}$	$V_{DD} = 20 \text{ V}$, $R_L = 1.0 \Omega$ $I_D \geq 20 \text{ A}$, $V_{GEN} = 4.5 \text{ V}$, $R_g = 1 \Omega$		102	155	ns
Rise Time	t_r			62	95	
Turn-Off Delay Time	$t_{d(\text{off})}$			180	270	
Fall Time	t_f			60	90	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25^\circ\text{C}$			70	A
Pulse Diode Forward Current ^a	I_{SM}				210	
Body Diode Voltage	V_{SD}	$I_S = 20 \text{ A}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 20 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$, $T_J = 25^\circ\text{C}$		60	120	ns
Body Diode Reverse Recovery Charge	Q_{rr}			70	105	
Reverse Recovery Fall Time	t_a			30		ns
Reverse Recovery Rise Time	t_b			20		

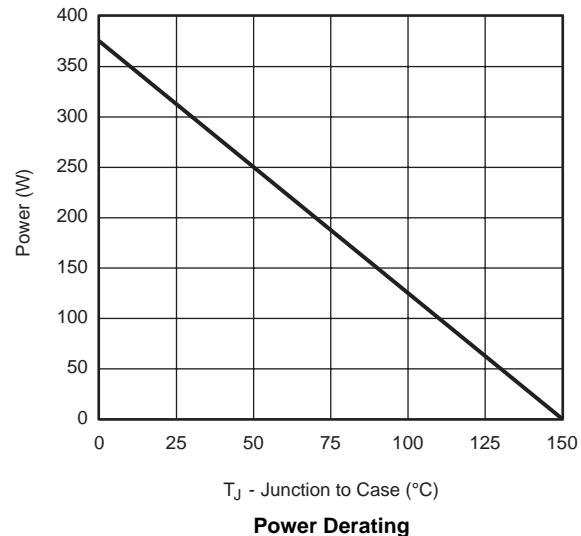
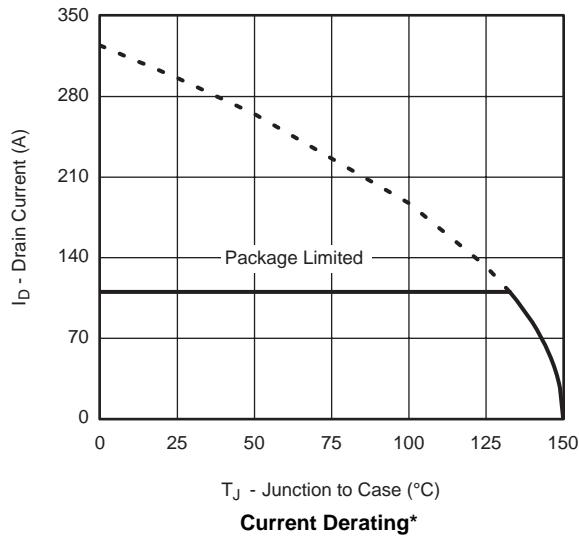
Notes:

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

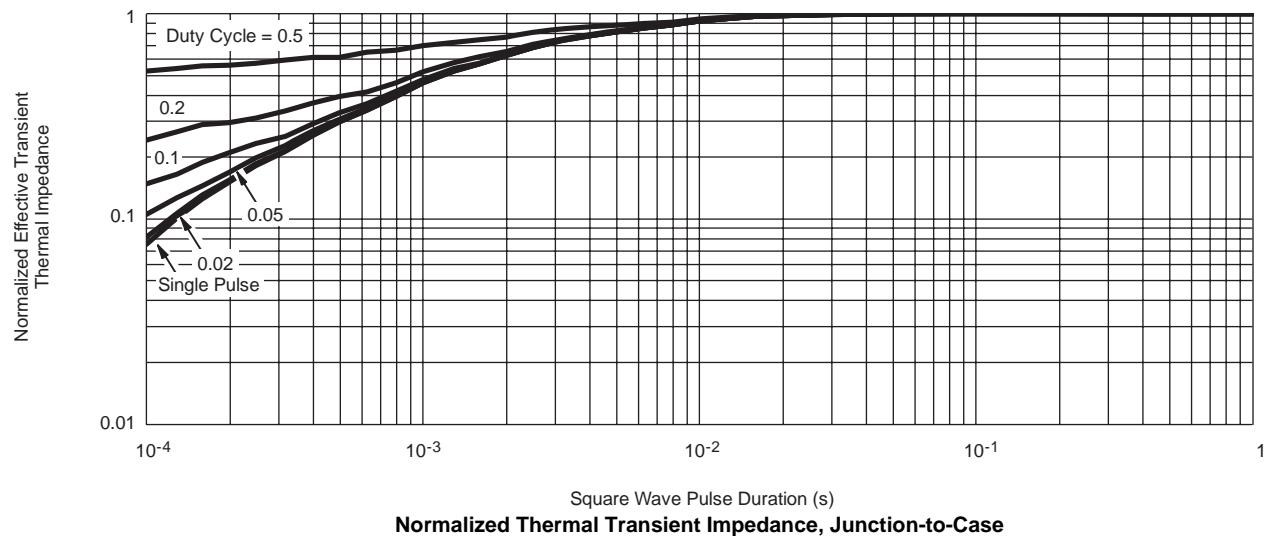
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


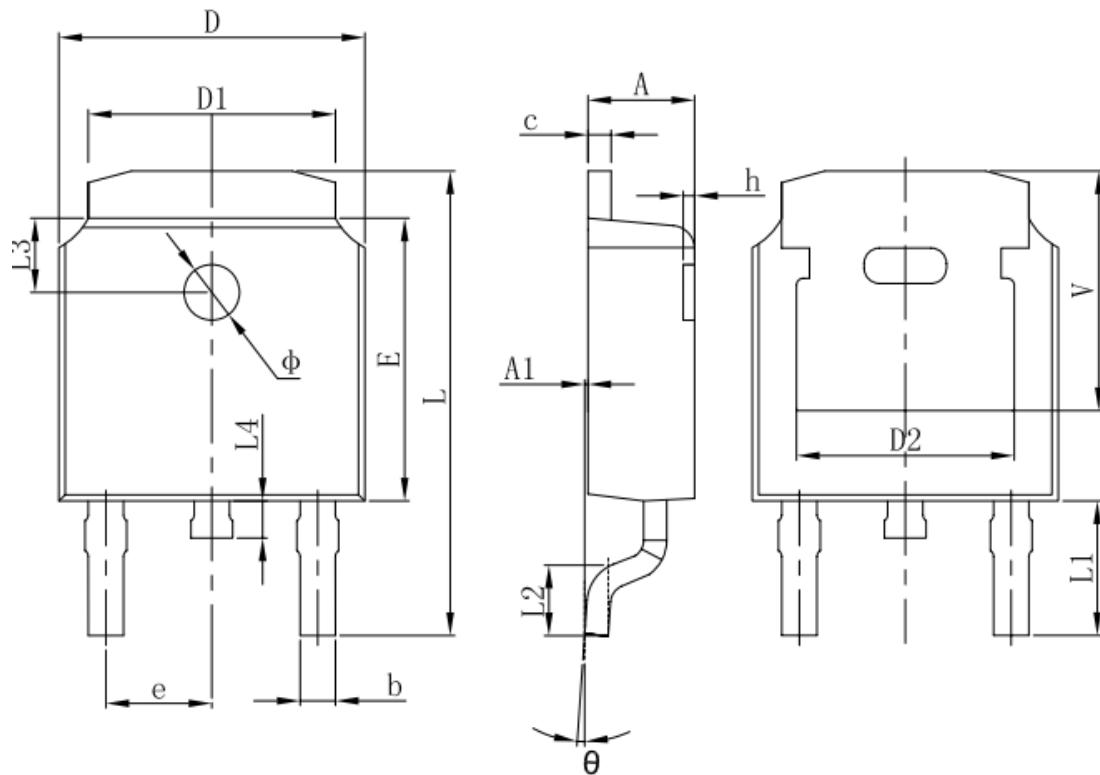
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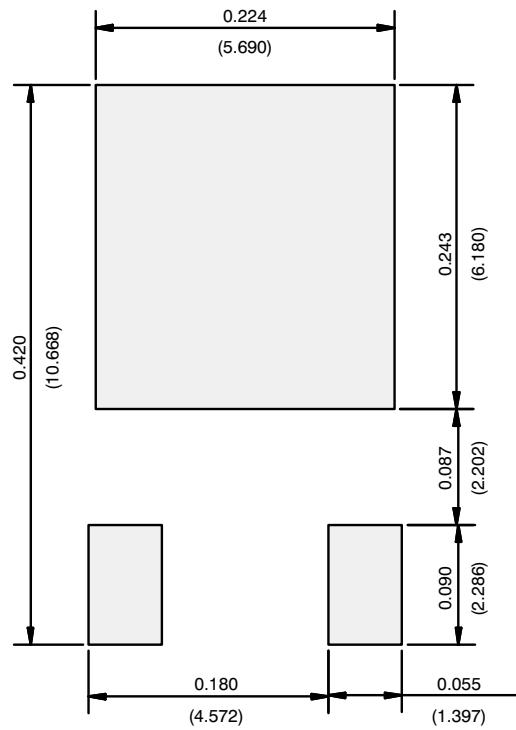
* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



TO252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.635	0.770	0.025	0.030
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF.		0.190 REF.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.712	10.312	0.382	0.406
L1	2.900 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF.		0.063 REF.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.250 REF.		0.207 REF.	

RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)

Recommended Minimum Pads
Dimensions in Inches/(mm)

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