

P-Channel 150 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 150	0.270 at V _{GS} = - 10 V	- 10	11.7
	0.280 at V _{GS} = - 4.5 V	- 8	

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE

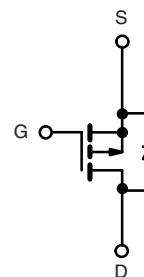
APPLICATIONS

- Power Switch
- DC/DC Converters

TO-252



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T _C = 25 °C, unless otherwise noted					
Parameter	Symbol	Limit	Unit		
Drain-Source Voltage	V _{DS}	- 150	V		
Gate-Source Voltage	V _{GS}	± 20			
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	- 10	A	
		T _C = 70 °C	- 8		
Pulsed Drain Current	I _{DM}	- 30			
Avalanche Current	I _{AS}	- 18			
Single Avalanche Energy ^a	E _{AS}	16.2	mJ		
Maximum Power Dissipation ^a	P _D	T _C = 25 °C	32.1 ^b	W	
		T _A = 25 °C ^c	2.5		
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C		

THERMAL RESISTANCE RATINGS				
Parameter	Symbol	Limit	Unit	
Junction-to-Ambient (PCB Mount) ^c	R _{thJA}	50	°C/W	
Junction-to-Case (Drain)	R _{thJC}	3.9		

Notes:

a. Duty cycle ≤ 1 %.

b. See SOA curve for voltage derating.

c. When Mounted on 1" square PCB (FR-4 material).

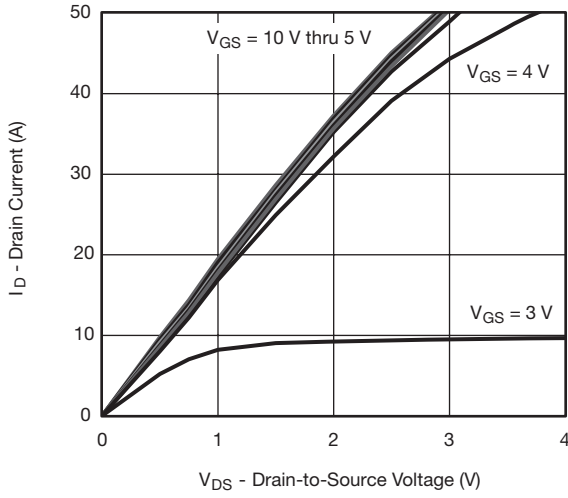
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-150			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1		-2.5	
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}	$V_{DS} = -120\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -120\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			-50	
		$V_{DS} = -120\text{ V}, V_{GS} = 0\text{ V}, T_J = 150\text{ }^\circ\text{C}$			-250	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -10\text{ V}, V_{GS} = -10\text{ V}$	-15			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -3.6\text{ A}$		0.270		Ω
		$V_{GS} = -4.5\text{ V}, I_D = -3.4\text{ A}$		0.280		
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -3.6\text{ A}$		12		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = -75\text{ V}, f = 1\text{ MHz}$		1000		μF
Output Capacitance	C_{oss}			65		
Reverse Transfer Capacitance	C_{rss}			41		
Total Gate Charge ^c	Q_g	$V_{DS} = -75\text{ V}, V_{GS} = -10\text{ V}, I_D = -3.6\text{ A}$		23.2	34.8	nC
		$V_{DS} = -75\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -3.6\text{ A}$		11.7	17.6	
Q_{gs}			3.5			
Q_{gd}			4.8			
Gate Resistance	R_g	$f = 1\text{ MHz}$	1.2	5.7	11.5	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DD} = -75\text{ V}, R_L = 17.2\text{ }\Omega$ $I_D \cong -2.9\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		7	14	ns
Rise Time ^c	t_r			12	18	
Turn-Off Delay Time ^c	$t_{d(off)}$			33	50	
Fall Time ^c	t_f			9	18	
Drain-Source Body Diode Ratings and Characteristics $T_C = 25\text{ }^\circ\text{C}$^b						
Continuous Current	I_S				-10	A
Pulsed Current	I_{SM}				-30	
Forward Voltage ^a	V_{SD}	$I_F = -2.9\text{ A}, V_{GS} = 0\text{ V}$		-0.8	-1.5	V
Reverse Recovery Time	t_{rr}	$I_F = -2.9\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		25	50	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			-4	-6	A
Reverse Recovery Charge	Q_{rr}				98	147

Notes:

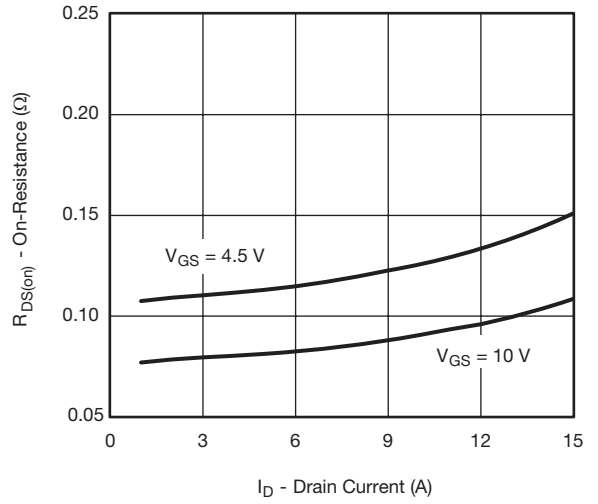
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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.

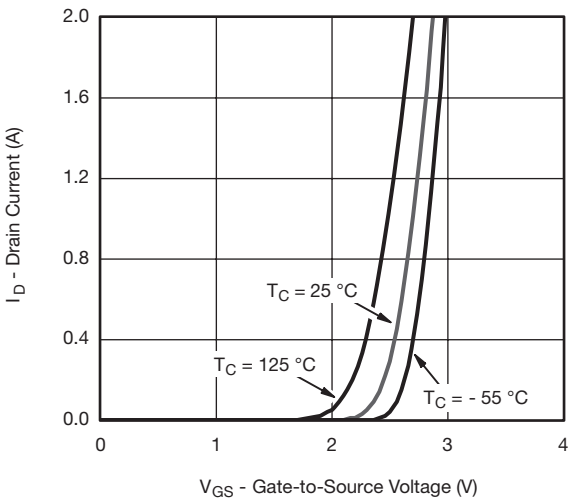
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



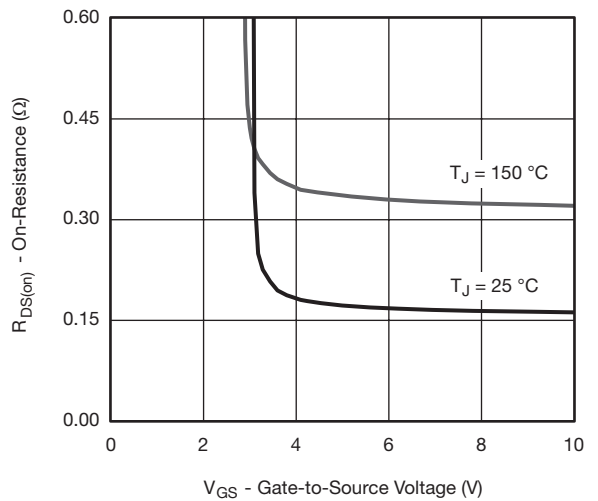
Output Characteristics



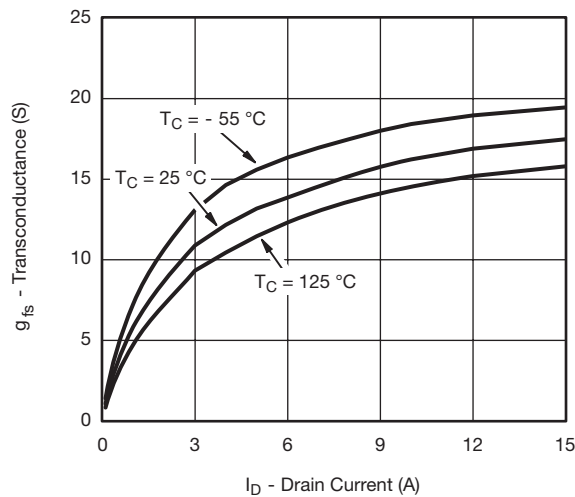
On-Resistance vs. Drain Current



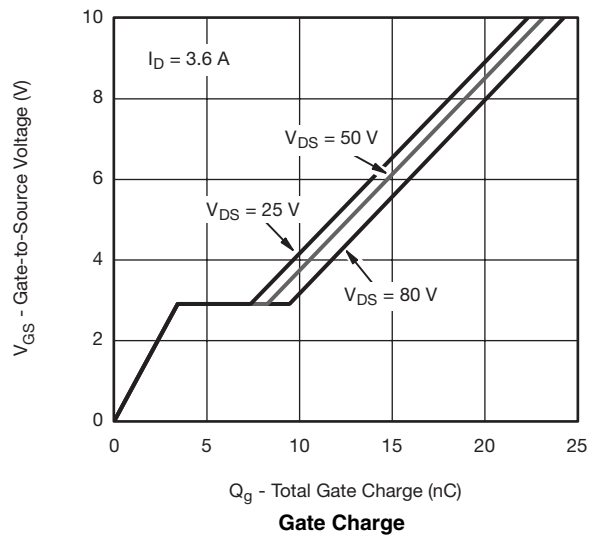
Transfer Characteristics



On-Resistance vs. Gate-to-Source Voltage

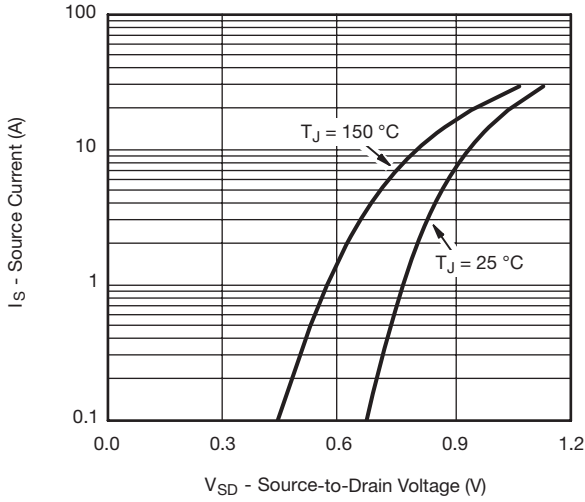


Transconductance

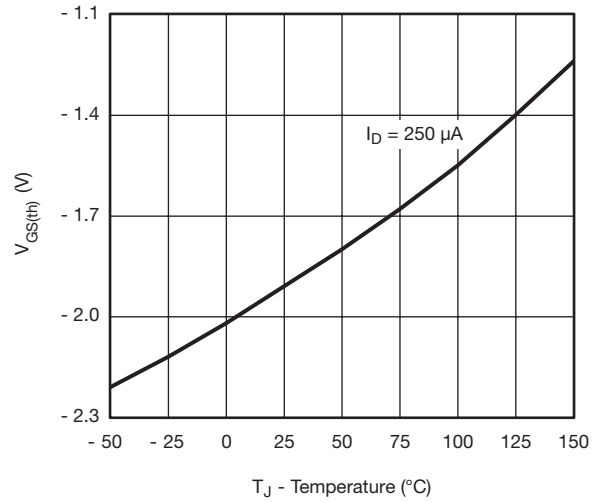


Gate Charge

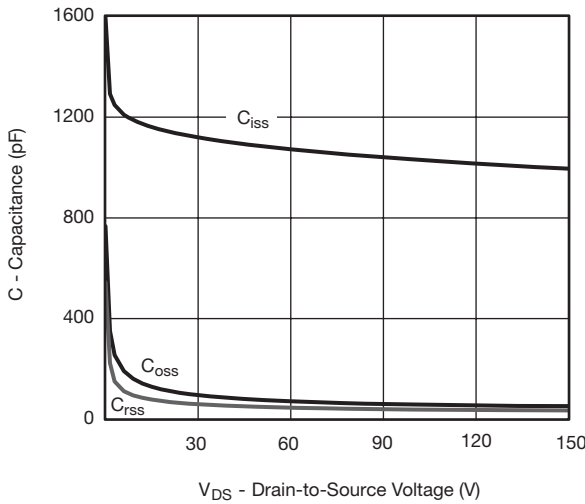
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



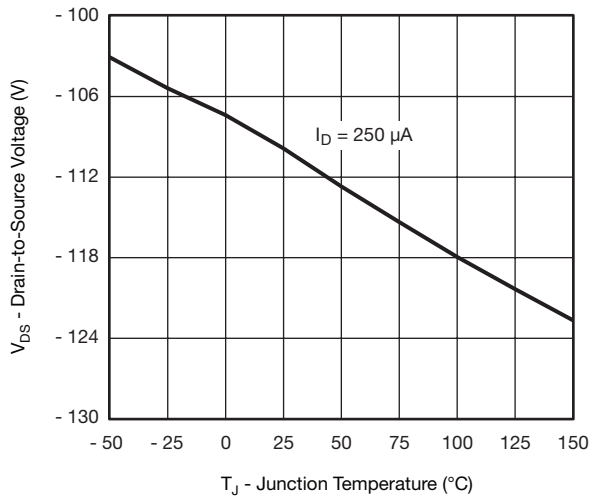
Source-Drain Diode Forward Voltage



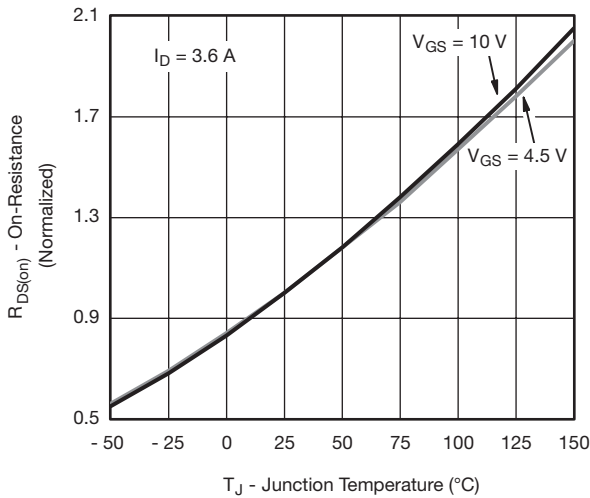
Threshold Voltage



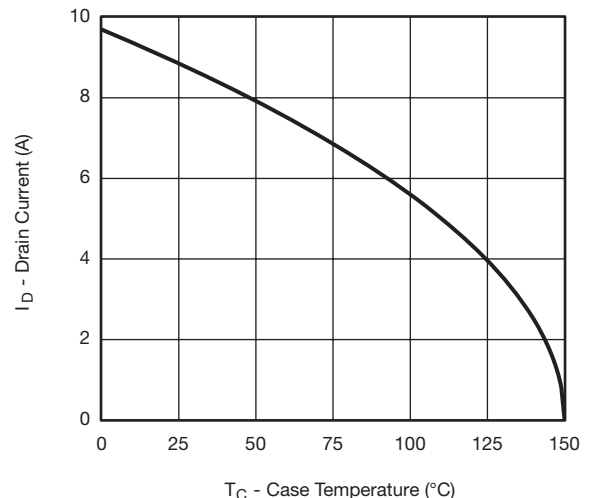
Capacitance



Drain Source Breakdown vs. Junction Temperature

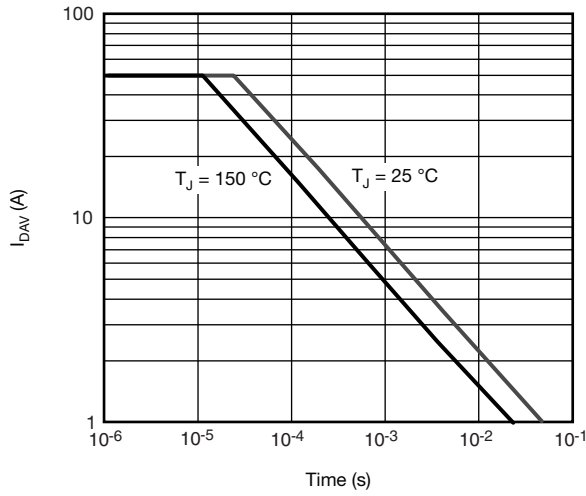


On-Resistance vs. Junction Temperature

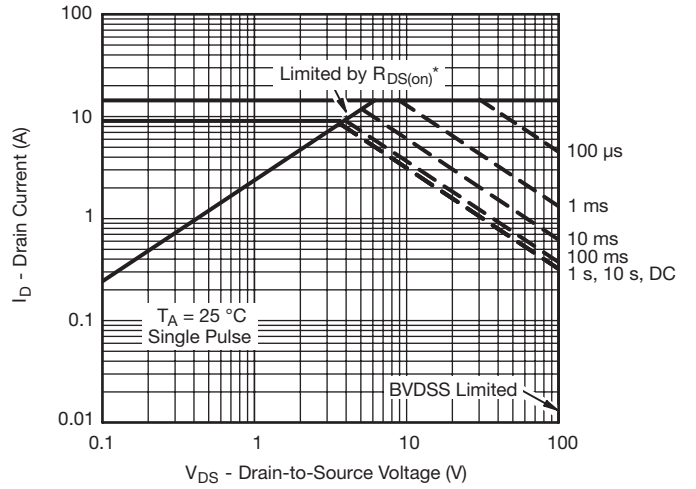


Current Derating

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

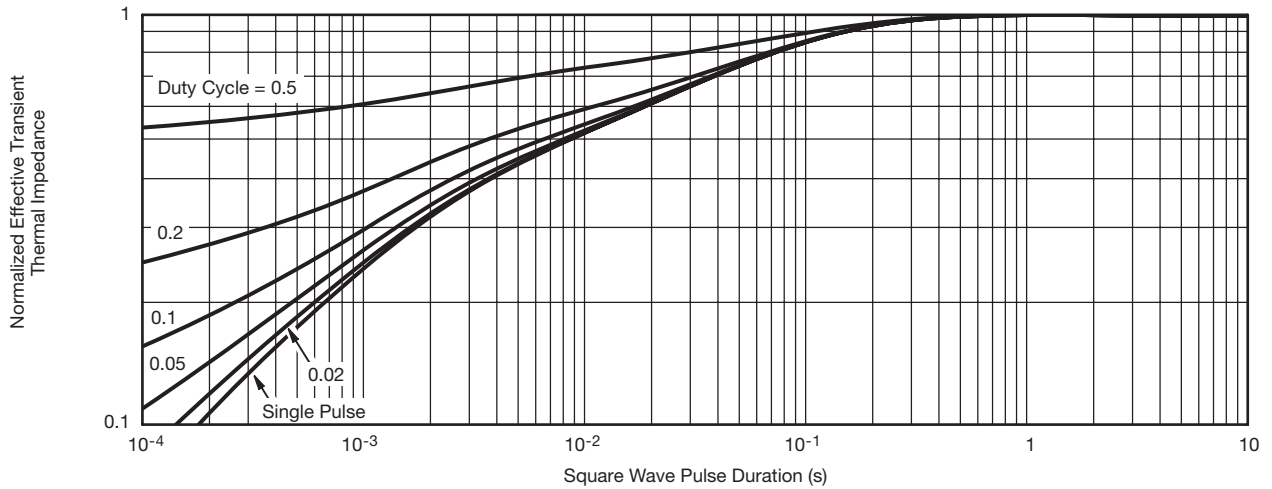


Single Pulse Avalanche Current Capability vs. Time



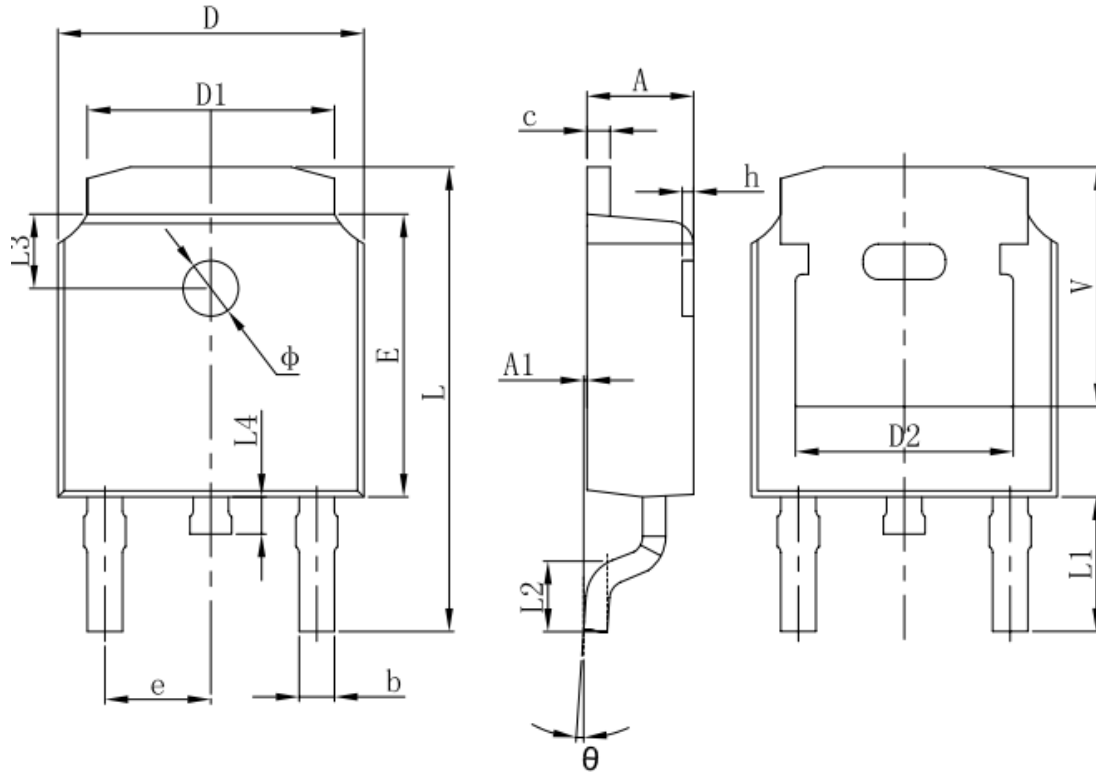
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



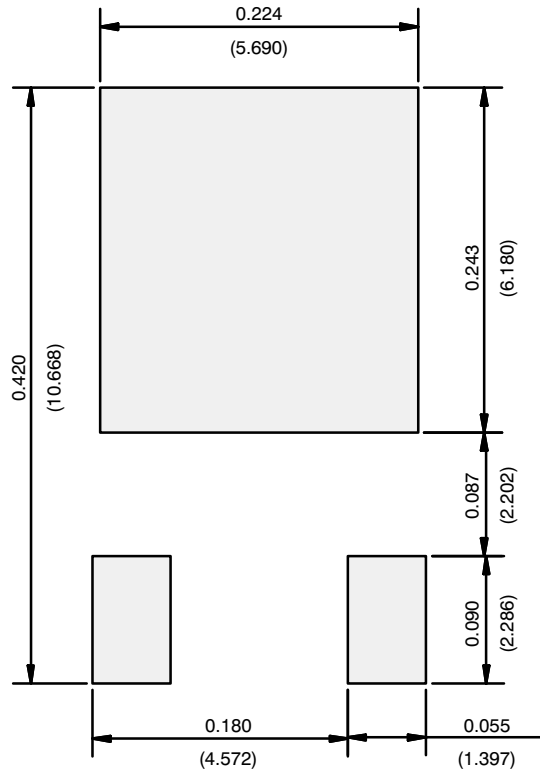
Normalized Thermal Transient Impedance, Junction-to-Case

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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