

Dual P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
- 60	2.5 at V _{GS} = - 10 V	- 0.3	1.6 nC
	3 at V _{GS} = - 4.5 V	- 0.2	

FEATURES

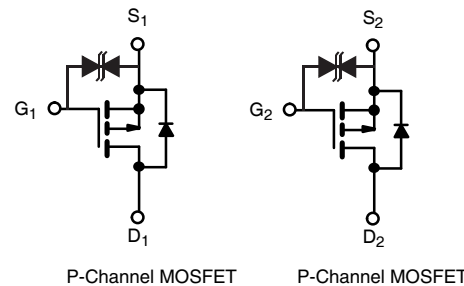
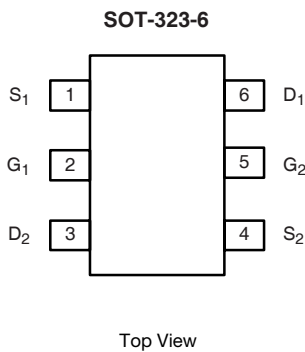
- DT-Trench Power MOSFET
- 100 % R_g tested
- PWM Optimized
- Compliant to RoHS Directive 2002/95/EC
- Typical ESD protection HBM Class 2



RoHS
COMPLIANT

APPLICATIONS

- LED Inverter Circuits
- DC/DC Conversion Circuits
- Motor drives
- Low power load switch



ABSOLUTE MAXIMUM RATINGS T _A = 25 °C, unless otherwise noted				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	- 60	V	
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	- 0.3 ^a	A
		T _C = 70 °C	- 0.21	
		T _A = 25 °C	- 0.15 ^{b, c}	
		T _A = 70 °C	- 0.09 ^{b, c}	
Pulsed Drain Current	I _{DM}	- 0.9		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	- 0.3	
		T _A = 25 °C	- 0.1 ^{b, c}	
Maximum Power Dissipation	P _D	T _C = 25 °C	0.3	W
		T _C = 70 °C	0.192	
		T _A = 25 °C	0.08 ^{b, c}	
		T _A = 70 °C	0.05 ^{b, c}	
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, d}	R _{thJA}	330	470	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	250	320	

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 5 s.
- Maximum under steady state conditions is 220 °C/W.

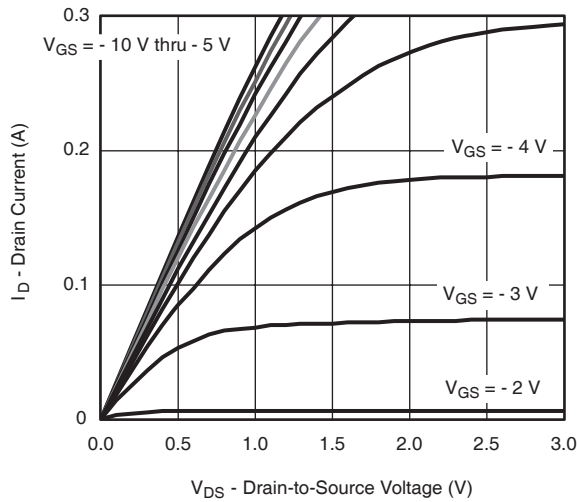
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		- 20		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			2		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1		- 3	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 10\text{ V}$			± 1	μA
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 10	
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			- 1	μA
		$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}, T_J = 85\text{ }^\circ\text{C}$			- 10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	- 0.3			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -0.1\text{ A}$		2.5	3	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -0.1\text{ A}$		3	4	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -10\text{ V}, I_D = -0.1\text{ A}$		150		mS
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		49		μF
Output Capacitance	C_{oss}			16		
Reverse Transfer Capacitance	C_{rss}			8		
Total Gate Charge	Q_g	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -0.1\text{ A}$		2.6	4.0	nC
		$V_{DS} = -30\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -0.1\text{ A}$		1.6	2.4	
Gate-Source Charge	Q_{gs}			0.36		
Gate-Drain Charge	Q_{gd}			0.33		
Gate Resistance	R_g	$f = 1\text{ MHz}$		150		Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 100\text{ }\Omega$ $I_D \equiv -0.1\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		3		ns
Rise Time	t_r			11		
Turn-Off Delay Time	$t_{d(off)}$			13		
Fall Time	t_f			11		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			- 0.3	A
Pulse Diode Forward Current ^a	I_{SM}				- 0.9	
Body Diode Voltage	V_{SD}	$I_S = -0.1\text{ A}$		- 0.8	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -0.1\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		19	30	ns
Body Diode Reverse Recovery Charge	Q_{rr}			15	25	nC
Reverse Recovery Fall Time	t_a			12		ns
Reverse Recovery Rise Time	t_b			4		

Notes:

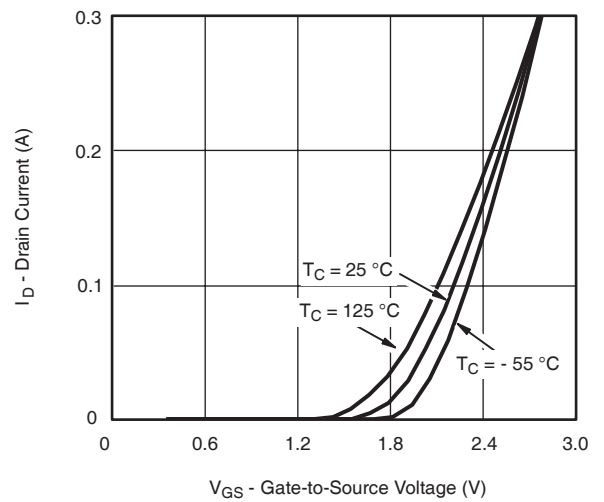
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
 b. Guaranteed by design, not subject to production testing.

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.

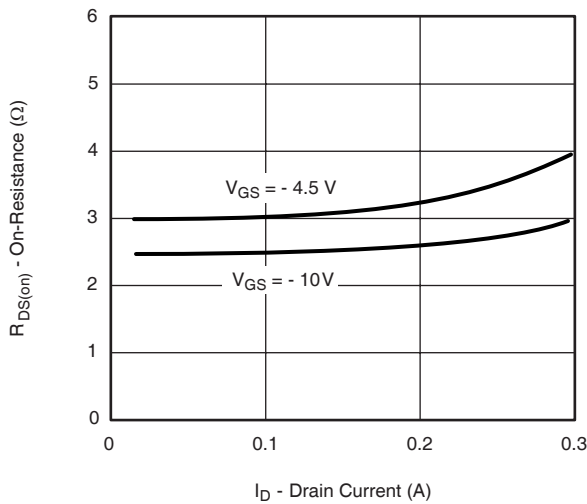
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



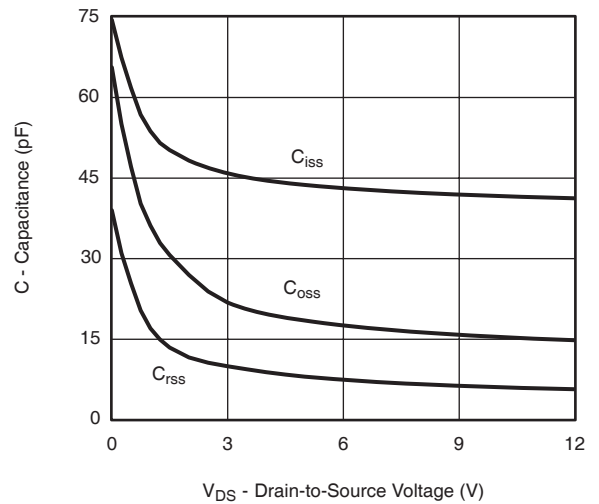
Output Characteristics



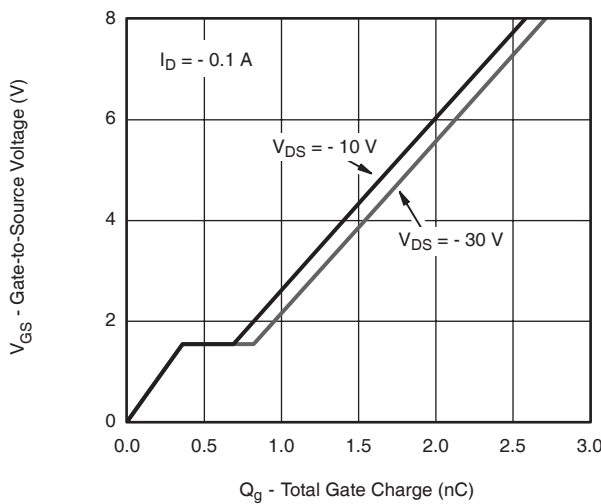
Transfer Characteristics



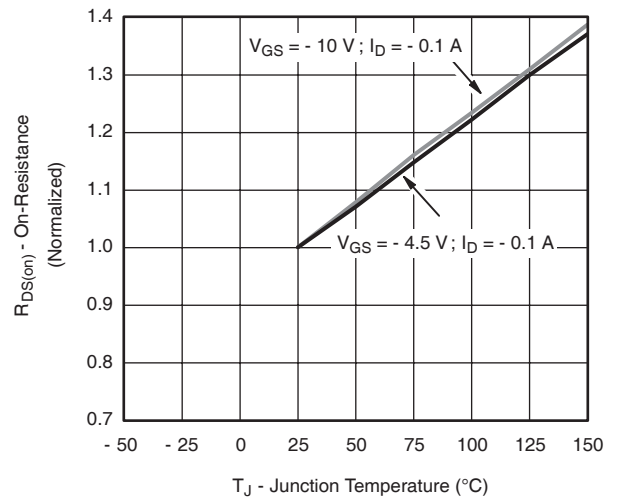
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

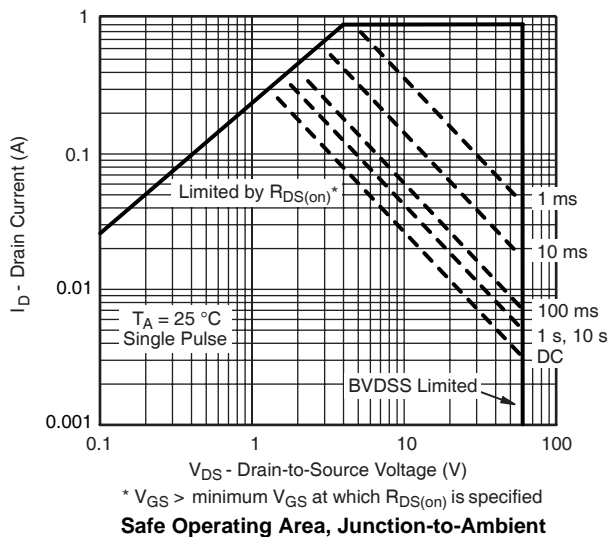
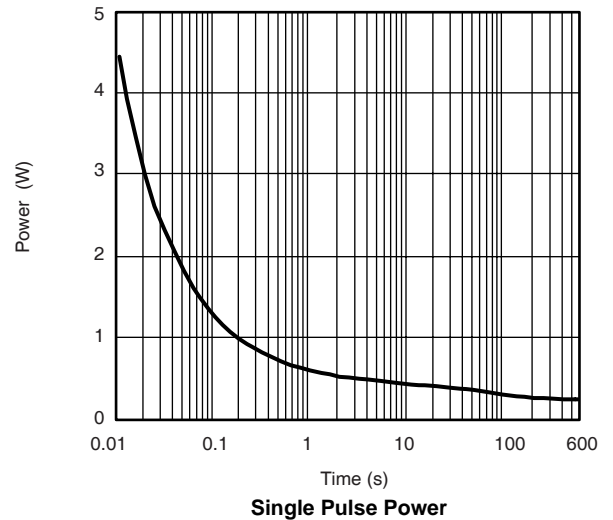
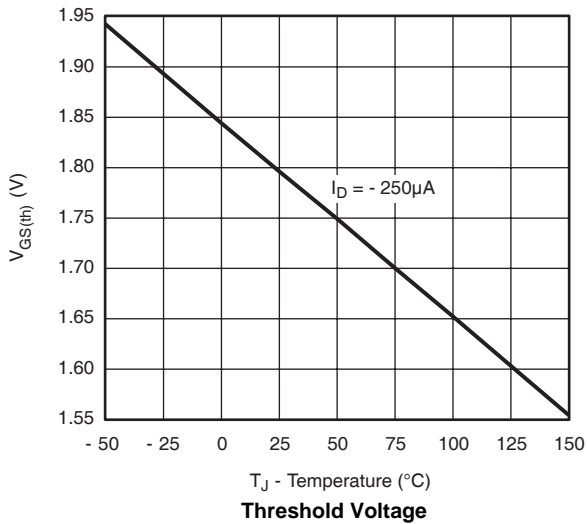
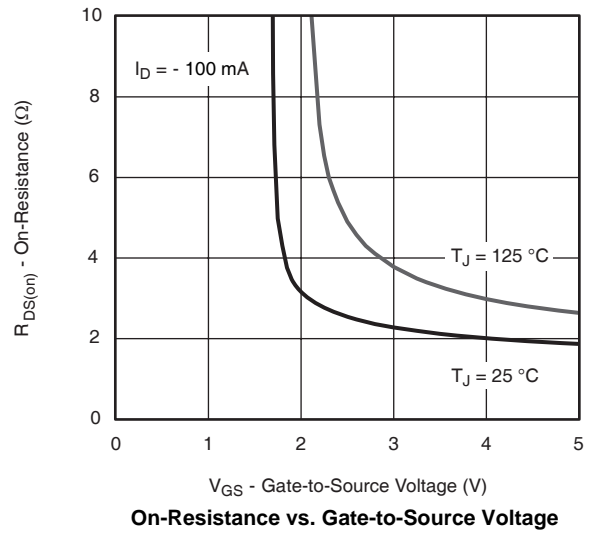
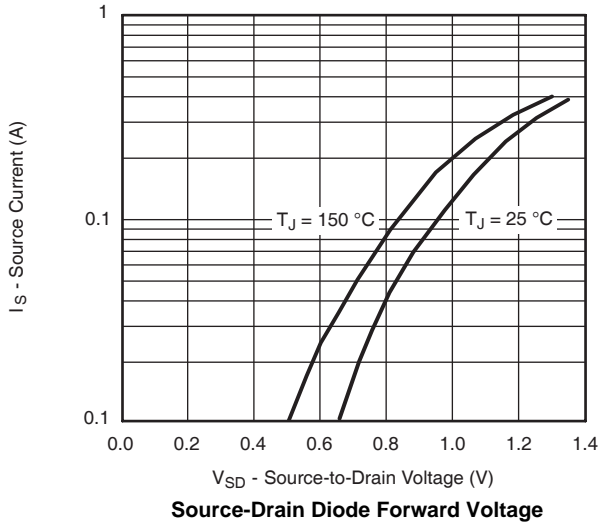


Gate Charge

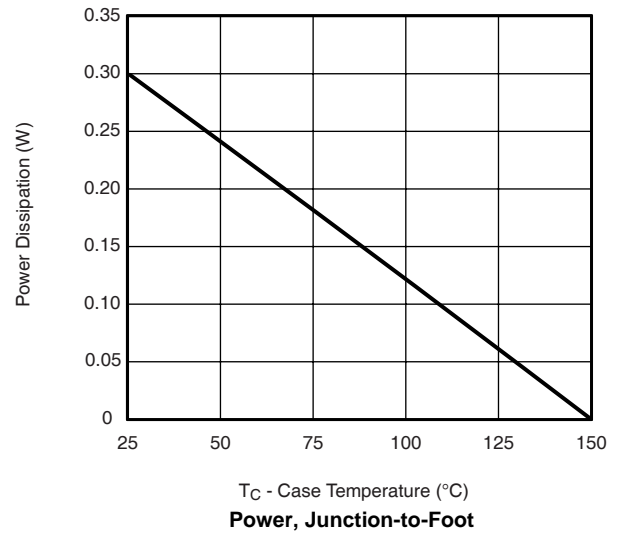
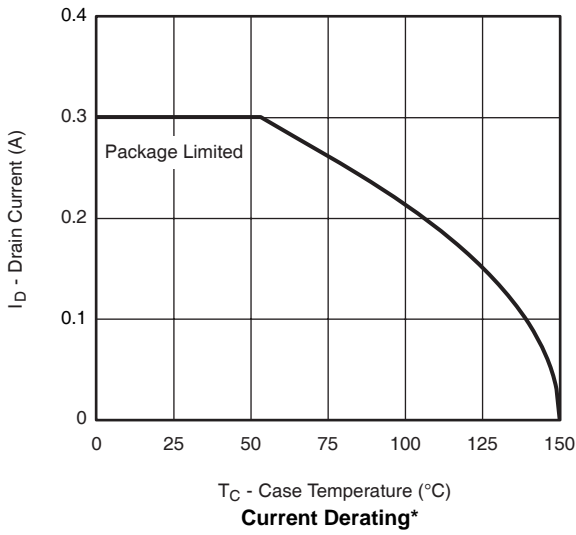


On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

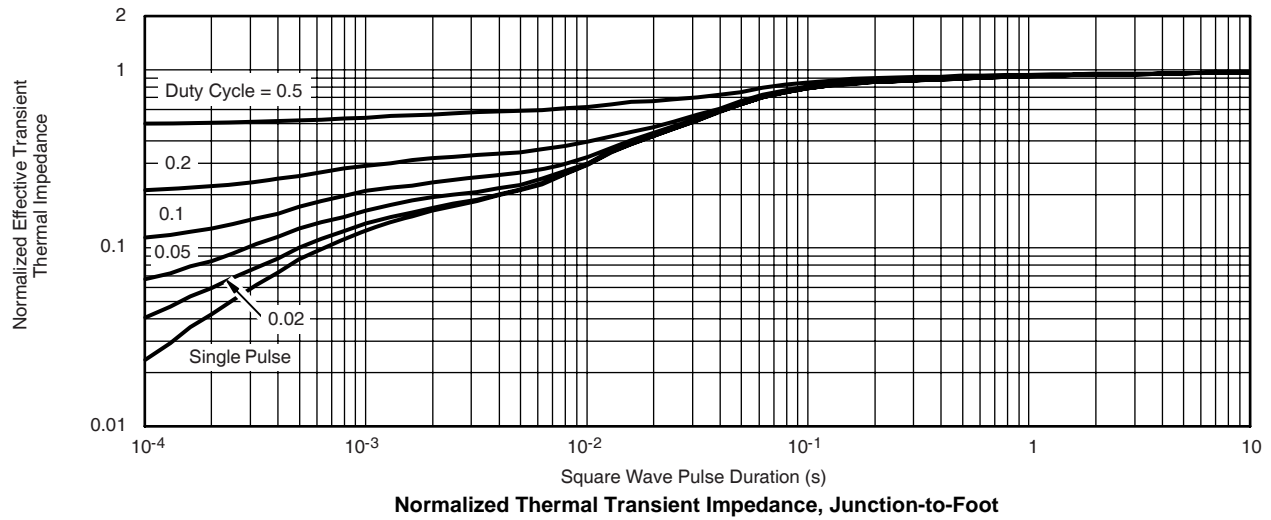
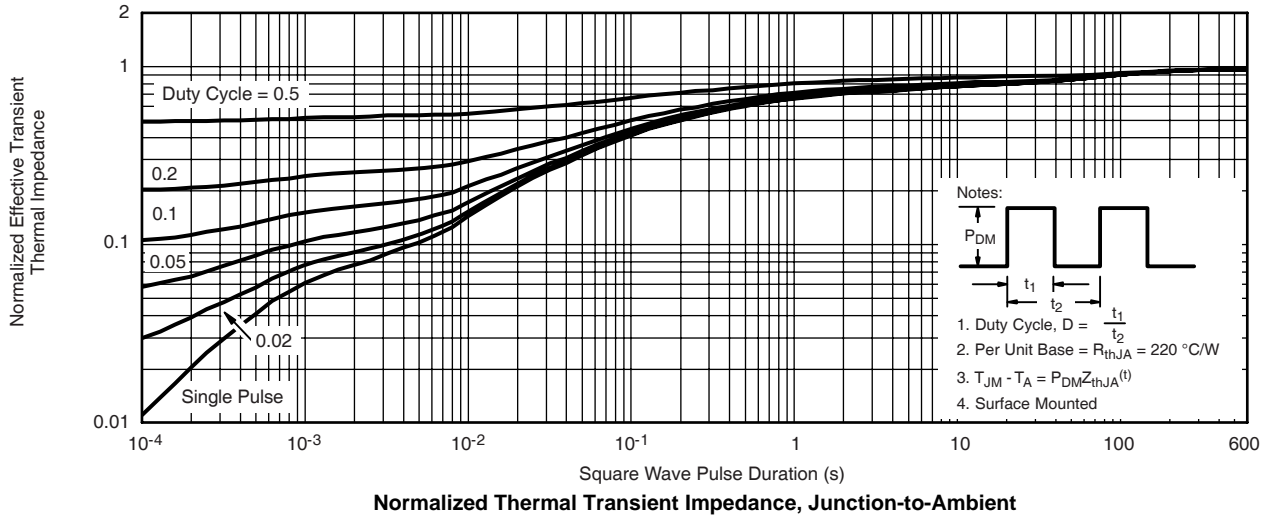


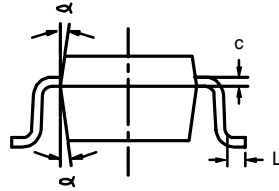
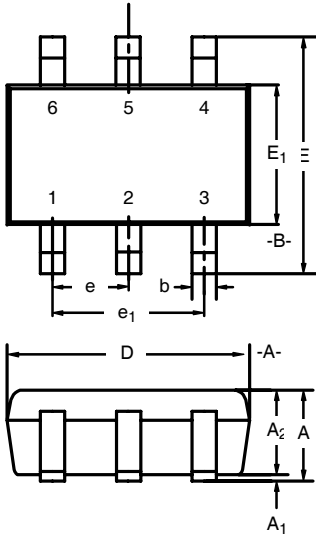
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



* 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.

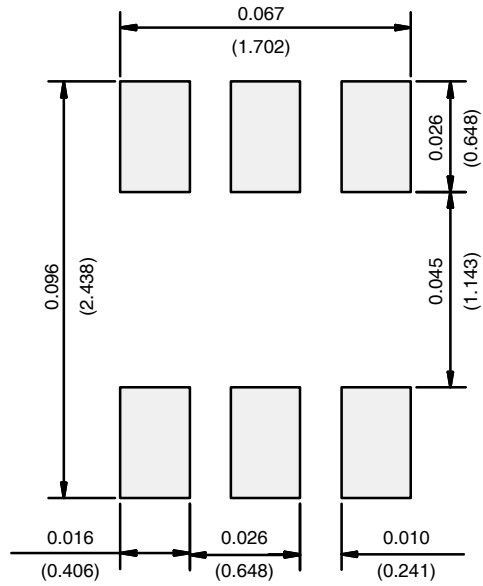
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





Dim	MILLIMETERS			INCHES		
	Min	Nom	Max	Min	Nom	Max
A	0.90	-	1.10	0.035	-	0.043
A ₁	-	-	0.10	-	-	0.004
A ₂	0.80	-	1.00	0.031	-	0.039
b	0.15	-	0.30	0.006	-	0.012
c	0.10	-	0.25	0.004	-	0.010
D	1.80	2.00	2.20	0.071	0.079	0.087
E	1.80	2.10	2.40	0.071	0.083	0.094
E ₁	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65BSC			0.026BSC		
e ₁	1.20	1.30	1.40	0.047	0.051	0.055
L	0.10	0.20	0.30	0.004	0.008	0.012
α	7°Nom			7°Nom		

RECOMMENDED MINIMUM PADS FOR SOT323: 6-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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