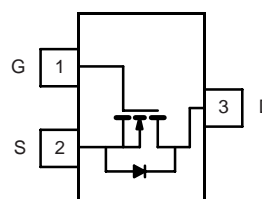
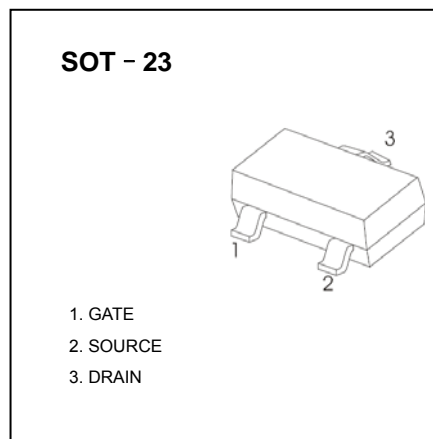


FEATURES

- $V_{DS} (V) = 30V$
- $R_{DS(ON)} < 30m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 33m\Omega$ ($V_{GS} = 4.5V$)

APPLICATIONS

- DC/DC Converter



ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150\text{ }^\circ\text{C}$)	I_D	$T_C = 25\text{ }^\circ\text{C}$	6.5 ^a
		$T_C = 70\text{ }^\circ\text{C}$	6.0
		$T_A = 25\text{ }^\circ\text{C}$	5.3
		$T_A = 70\text{ }^\circ\text{C}$	5.0
Pulsed Drain Current	I_{DM}	25	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$	1.4
		$T_A = 25\text{ }^\circ\text{C}$	0.9 ^{b, c}
Maximum Power Dissipation	P_D	$T_C = 25\text{ }^\circ\text{C}$	1.7
		$T_C = 70\text{ }^\circ\text{C}$	1.1
		$T_A = 25\text{ }^\circ\text{C}$	1.1 ^{b, c}
		$T_A = 70\text{ }^\circ\text{C}$	0.7 ^{b, c}
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R_{thJA}	90	115	$^\circ\text{C/W}$
Maximum Junction-to-Foot (Drain)	R_{thJF}	60	75	

Notes:

- a. Package limited
- b. Surface Mounted on 1" x 1" FR4 board.
- c. $t = 5\text{ s}$.
- d. Maximum under steady state conditions is 130 $^\circ\text{C/W}$.

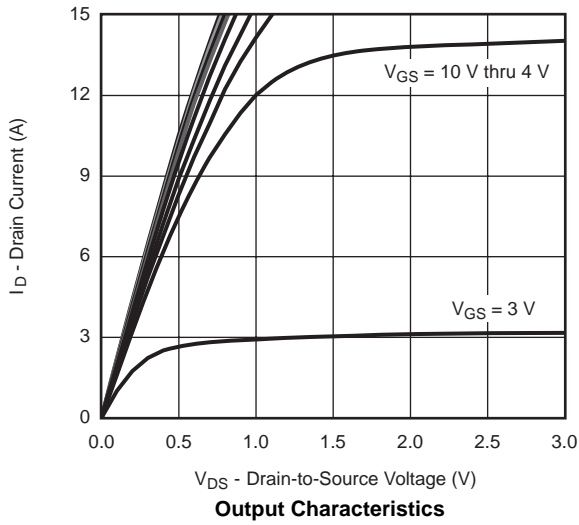
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		31		mV/ $^\circ\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	0.7	1.1	2.0	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}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	10			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 3.2\text{ A}$			30	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 2.8\text{ A}$			33	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 4.8\text{ A}$		11		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		335		pF
Output Capacitance	C_{oss}			45		
Reverse Transfer Capacitance	C_{riss}			17		
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 3.4\text{ A}$		4.5	6.7	nC
		$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 3.4\text{ A}$		2.1	3.2	
Gate-Source Charge	Q_{gs}	$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 3.4\text{ A}$		0.85		
Gate-Drain Charge	Q_{gd}			0.65		
Gate Resistance	R_g	$f = 1\text{ MHz}$	0.8	4.4	8.8	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 5.6\text{ }\Omega$ $I_D \cong 2.7\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		12	20	ns
Rise Time	t_r			50	75	
Turn-Off Delay Time	$t_{d(off)}$			12	20	
Fall Time	t_f			22	35	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 5.6\text{ }\Omega$ $I_D \cong 2.7\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		5	10	
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			10	15	
Fall Time	t_f			5	10	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			1.4	A
Pulse Diode Forward Current	I_{SM}				15	
Body Diode Voltage	V_{SD}	$I_S = 2.7\text{ A}, V_{GS} = 0\text{ V}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 2.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		10	20	ns
Body Diode Reverse Recovery Charge	Q_{rr}			5	10	nC
Reverse Recovery Fall Time	t_a			6		ns
Reverse Recovery Rise Time	t_b			4		

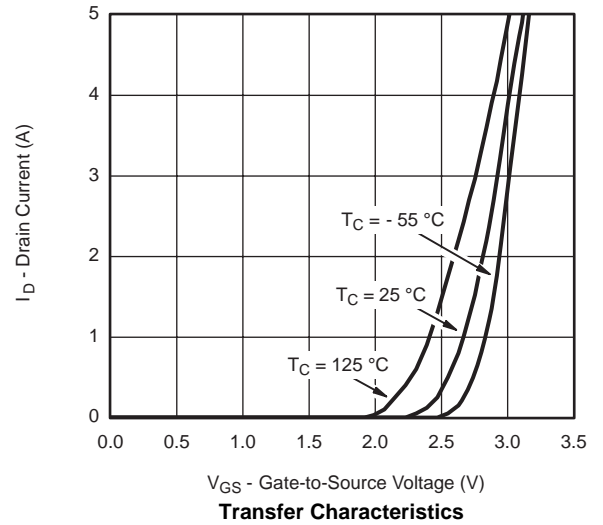
Notes:

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

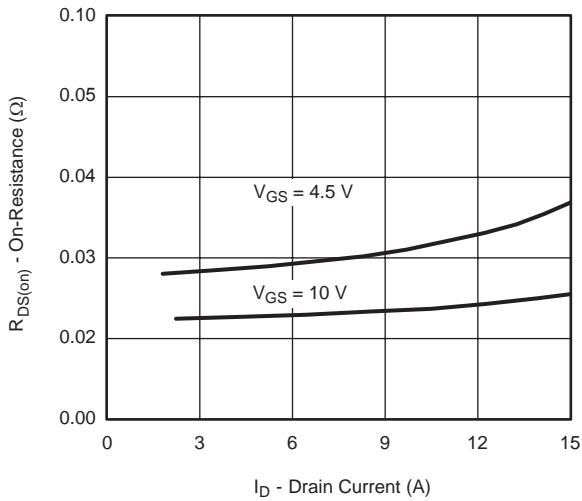
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



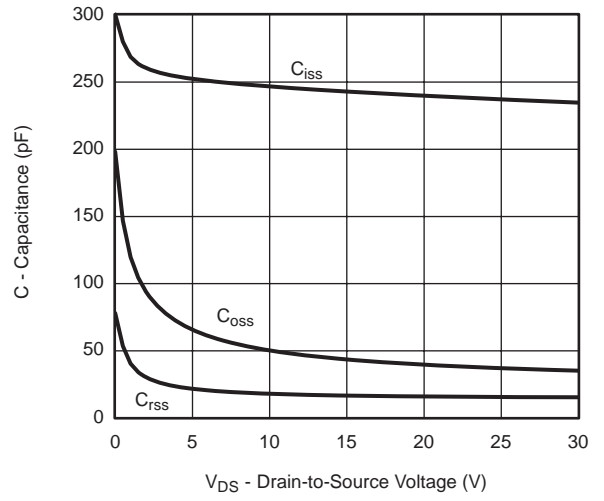
Output Characteristics



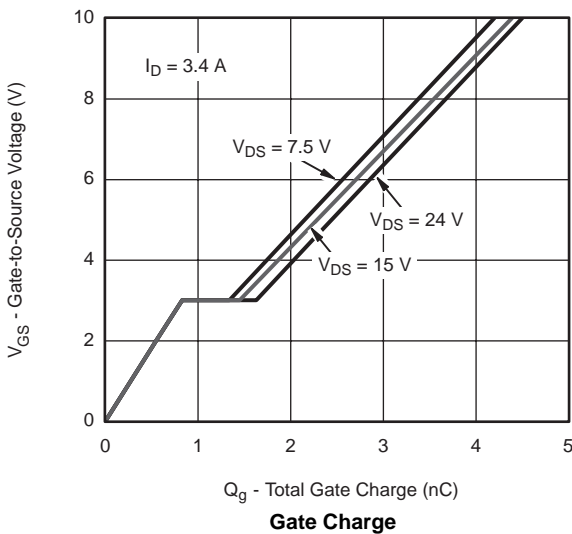
Transfer Characteristics



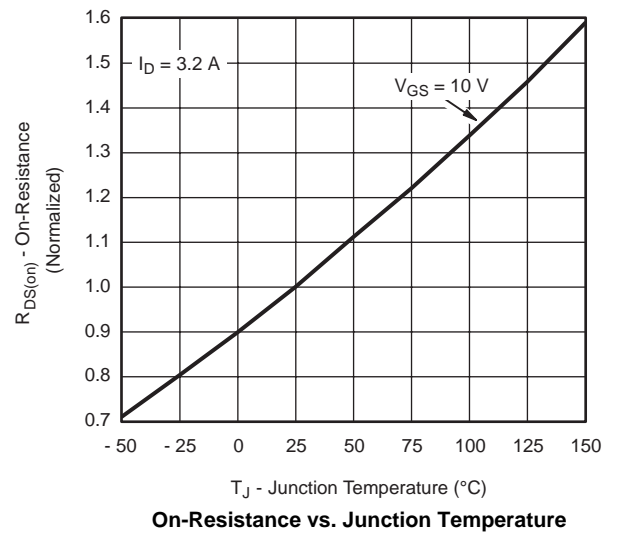
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

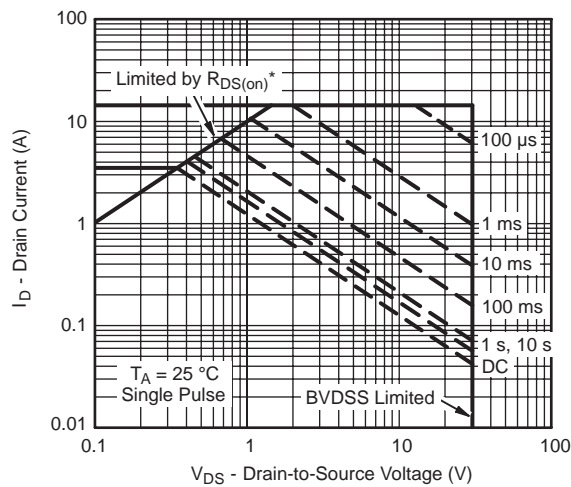
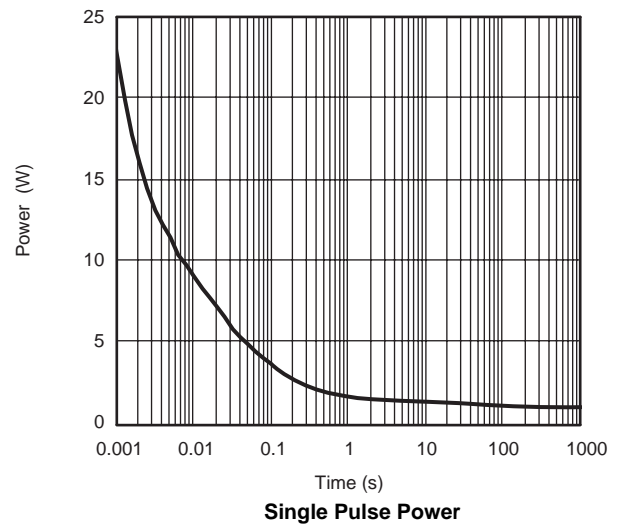
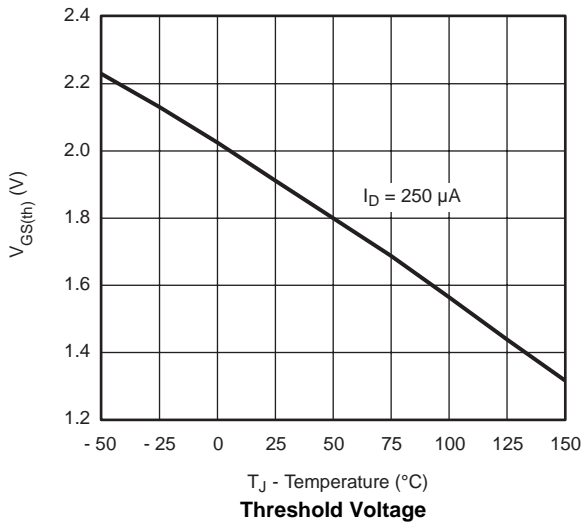
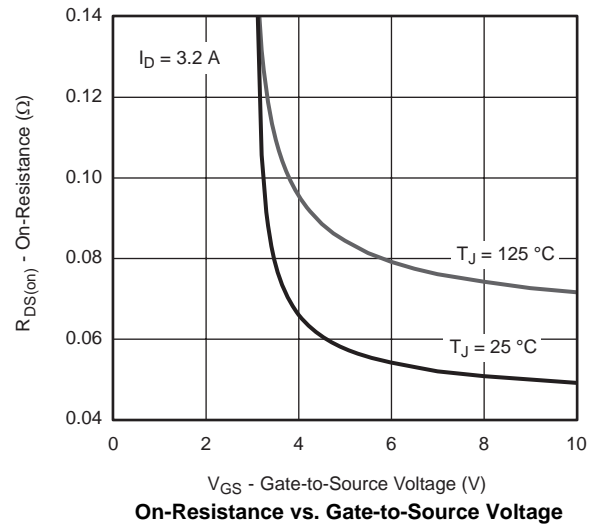
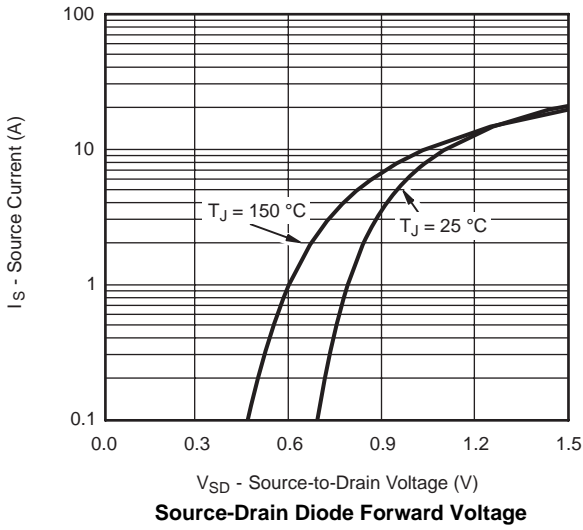


Gate Charge



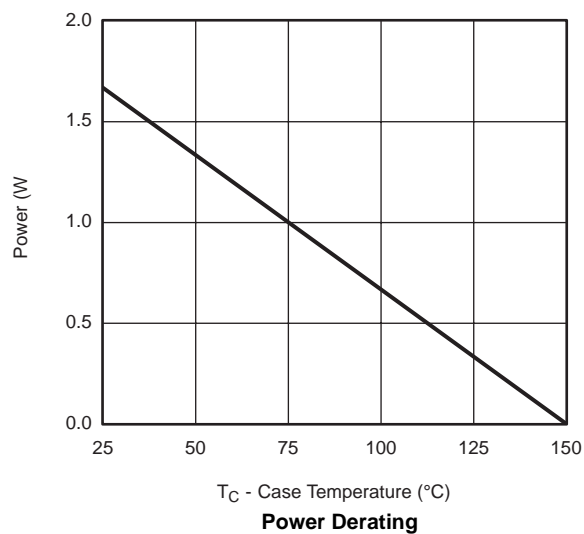
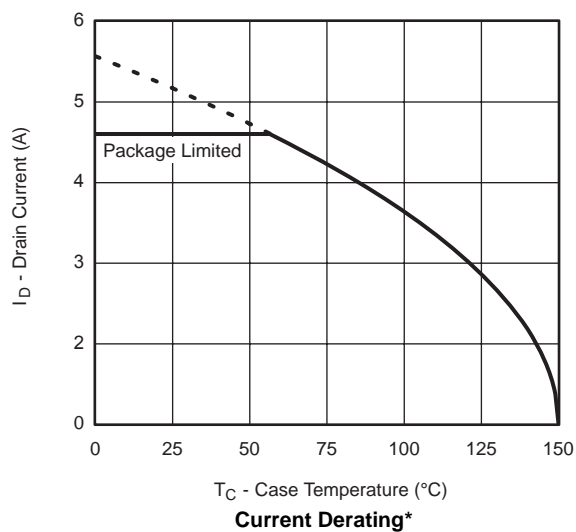
On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



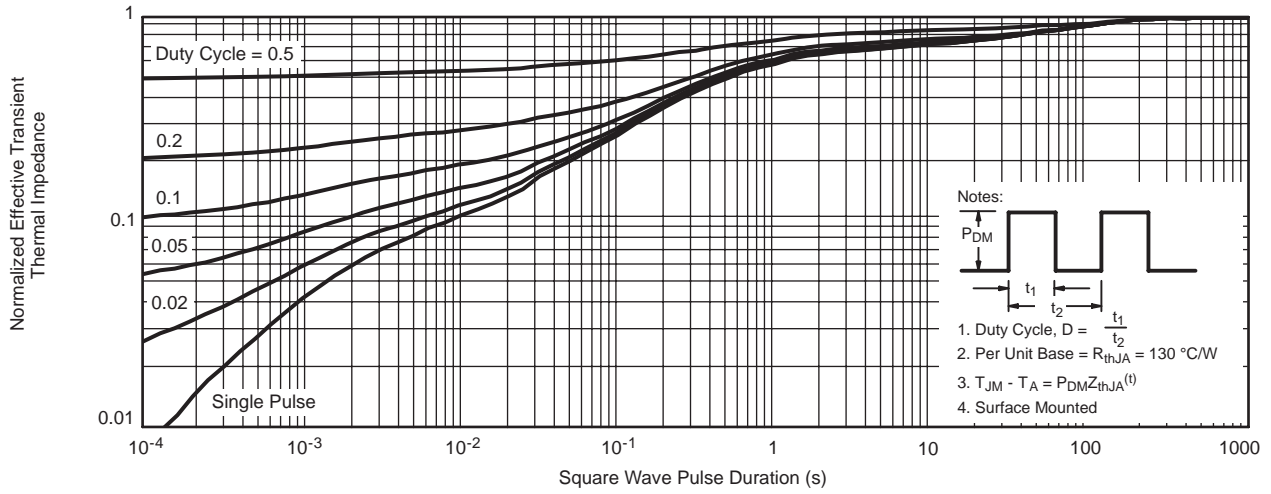
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

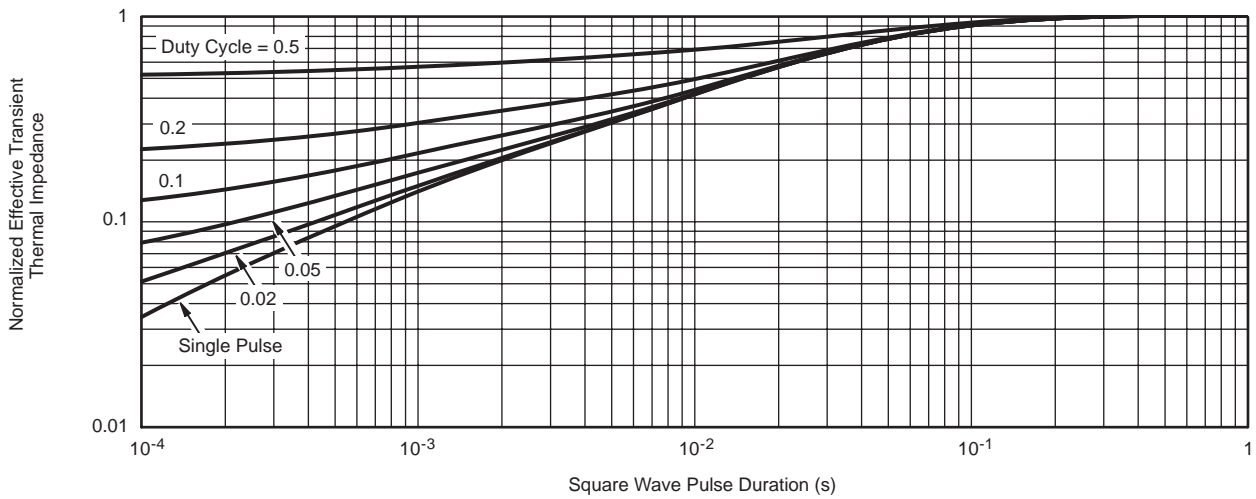


* The power dissipation P_D is based on $T_{J(max)} = 150\text{ °C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

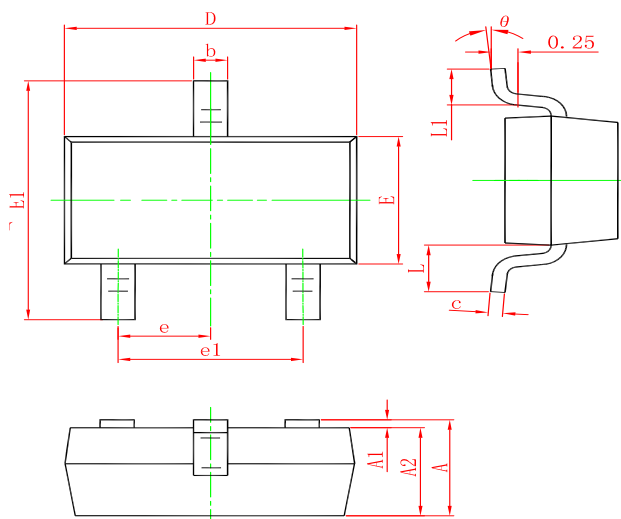


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

SOT-23 PACKAGE OUTLINE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
IRLML0040TR	SOT-23	3000	Tape and reel