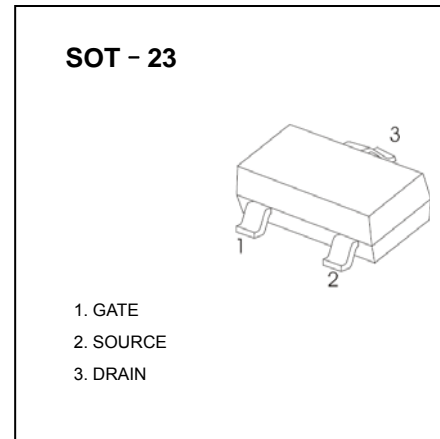


N-Channel 60-V (D-S) MOSFET

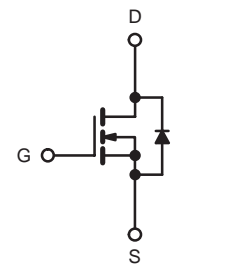
PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)	I _D (A) ^a	Q _g (Typ.)
60	85 at V _{GS} = 10 V	4.0	2.1 nC
	96 at V _{GS} = 4.5 V	3.8	



APPLICATIONS

- Battery Switch
- DC/DC Converter



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^\circ\text{C}$, unles

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	A
		T _C = 70 °C	
		T _A = 25 °C	
		T _A = 70 °C	
Pulsed Drain Current	I _{DM}	12	A
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	
		T _A = 25 °C	0.91 ^{b, c}
Avalanche Current	I _{AS}	6	mJ
Single-Pulse Avalanche Energy	E _{AS}	1.8	
Maximum Power Dissipation	P _D	T _C = 25 °C	W
		T _C = 70 °C	
		T _A = 25 °C	
		T _A = 70 °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}	90	115	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	60	75	

Notes:

- Based on T_C = 25 °C.
- Surface Mounted on 1" x 1" FR4 board.
- t = 5 s.
- Maximum under Steady State conditions is 120 °C/W.

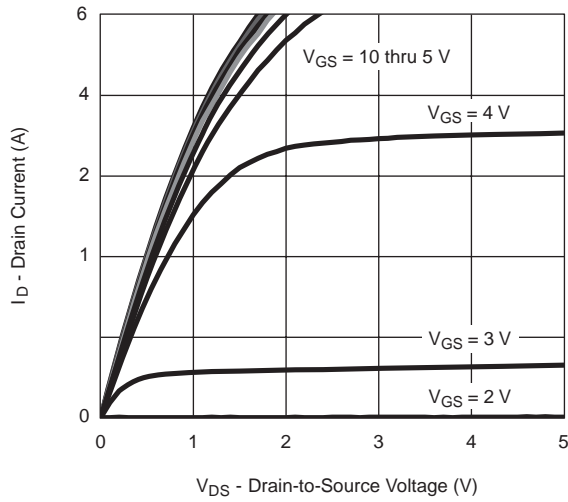
MOSFET SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		55		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	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}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	8			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 1.9\text{ A}$		75	85	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 1.7\text{ A}$		86	96	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 1.9\text{ A}$		5		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		180		pF
Output Capacitance	C_{oss}			22		
Reverse Transfer Capacitance	C_{rss}			13		
Total Gate Charge	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 1.9\text{ A}$		4.2	6.1	nC
				2.1	3.2	
Gate-Source Charge	Q_{gs}	$V_{DS} = 30\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 1.9\text{ A}$		0.7		
Gate-Drain Charge	Q_{gd}			1		
Gate Resistance	R_g		$f = 1\text{ MHz}$	0.6	2.2	5.1
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 20\text{ }\Omega$ $I_D \cong 1.5\text{ A}, V_{GEN} = 10\text{ V}, R_G = 1\text{ }\Omega$		4	6	ns
Rise Time	t_r			10	15	
Turn-Off Delay Time	$t_{d(off)}$			10	15	
Fall Time	t_f			7	10.5	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 20\text{ }\Omega$ $I_D = 1.5\text{ A}, V_{GEN} = 4.5\text{ V}, R_G = 1\text{ }\Omega$		15	23	ns
Rise Time	t_r			16	24	
Turn-Off Delay Time	$t_{d(off)}$			11	17	
Fall Time	t_f			11	17	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			2.19	A
Pulse Diode Forward Current ^a	I_{SM}				7	
Body Diode Voltage	V_{SD}	$I_S = 1.5\text{ A}$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 1.5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		15	23	ns
Body Diode Reverse Recovery Charge	Q_{rr}			10	15	nC
Reverse Recovery Fall Time	t_a			12		ns
Reverse Recovery Rise Time	t_b			3		

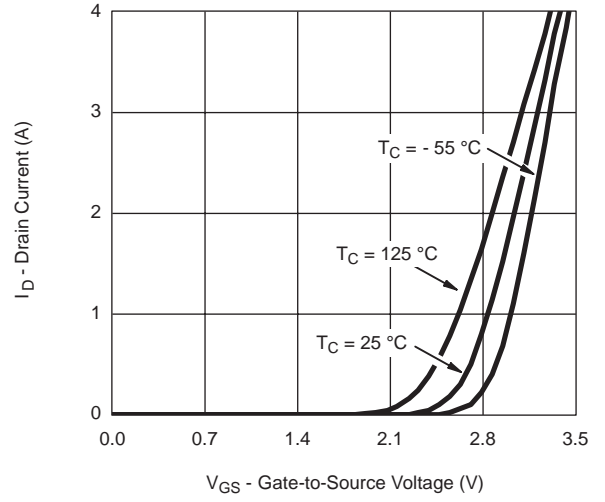
Notes:

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

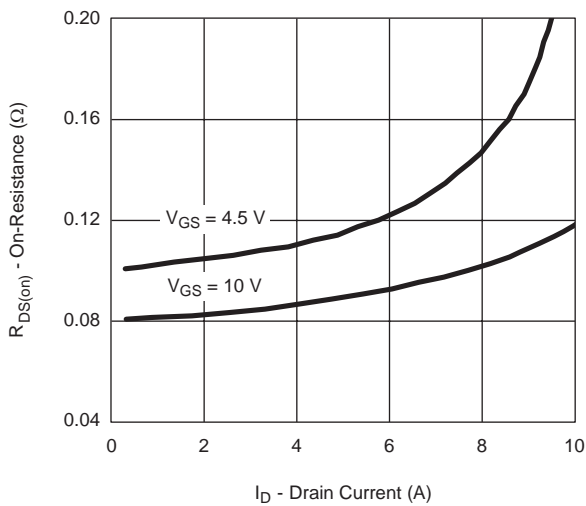
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



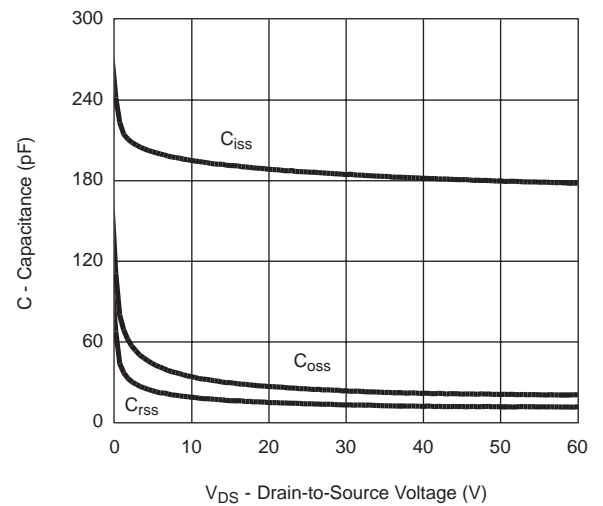
Output Characteristics



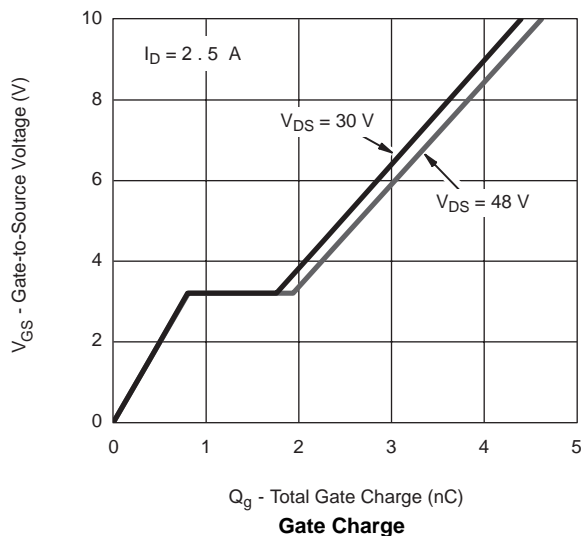
Transfer Characteristics



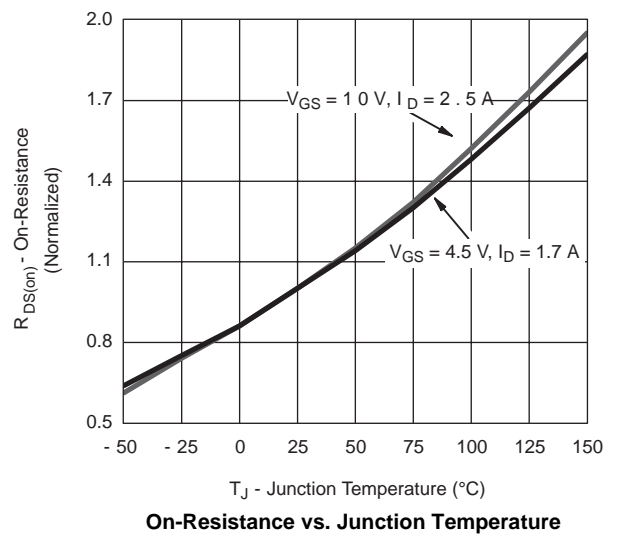
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

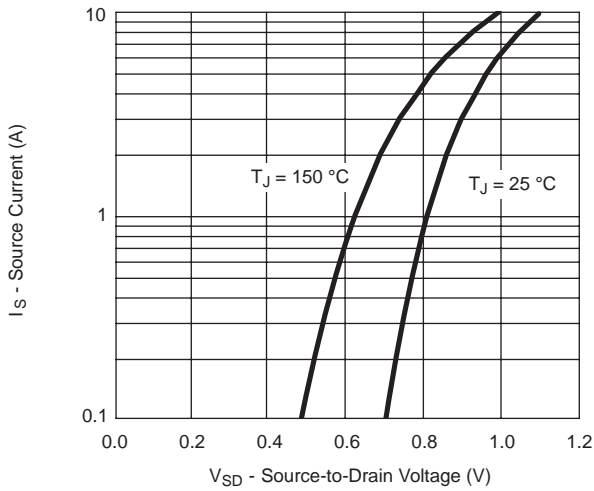


Gate Charge

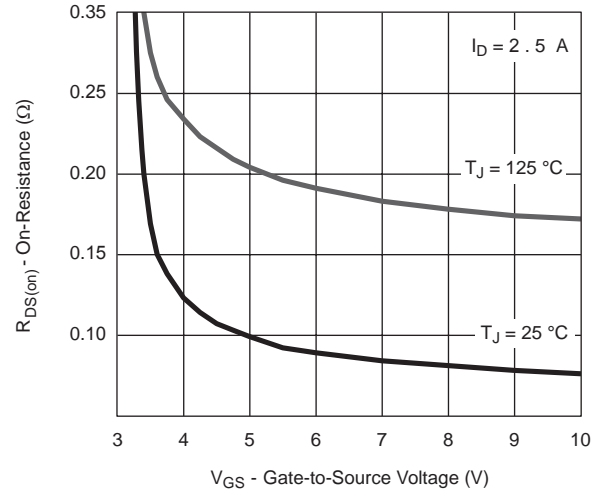


On-Resistance vs. Junction Temperature

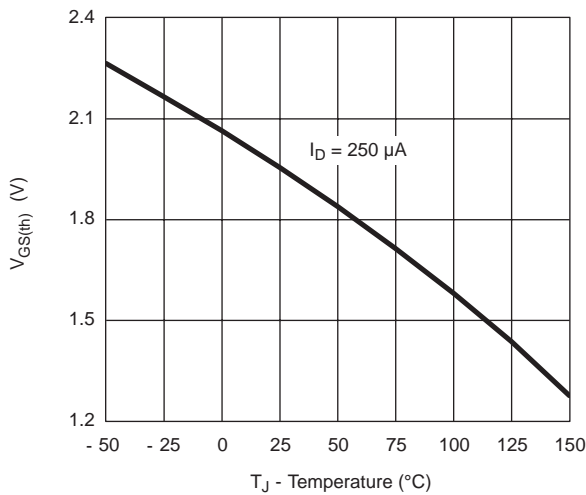
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



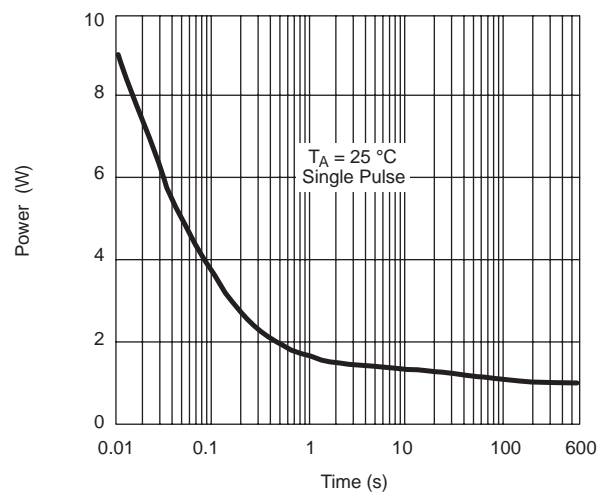
Source-Drain Diode Forward Voltage



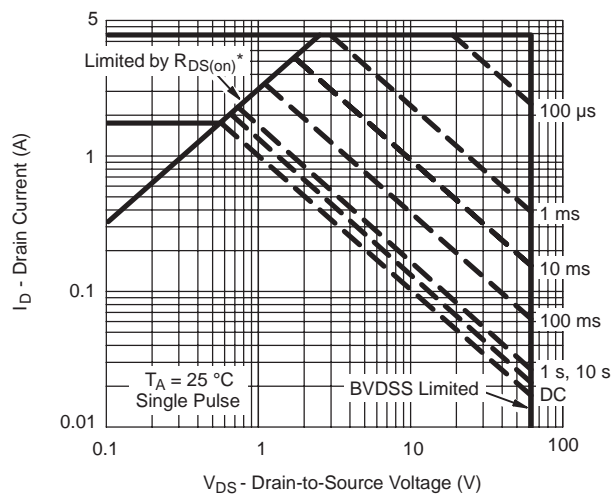
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



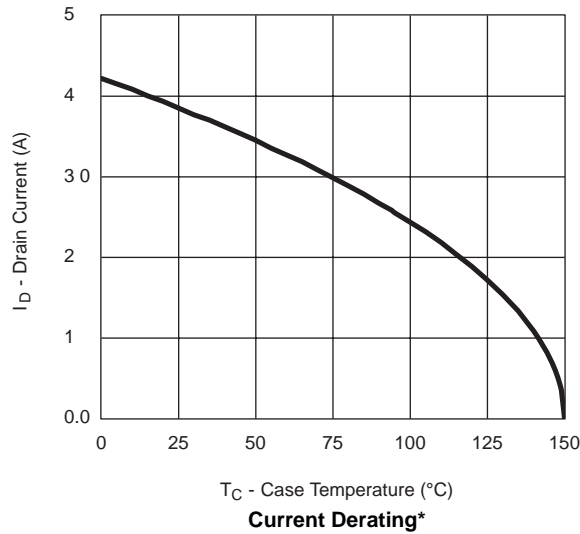
Single Pulse Power



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

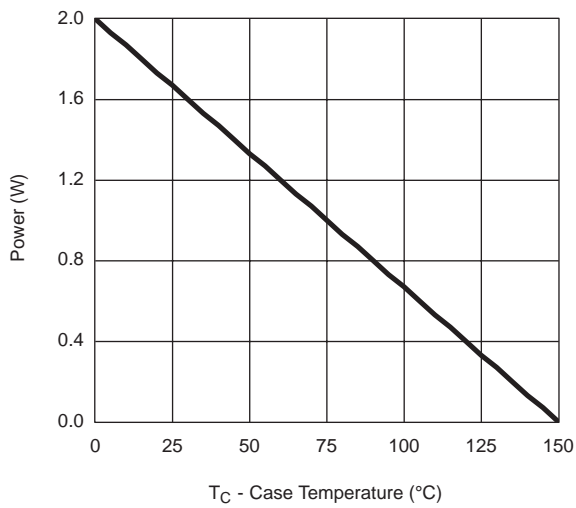
Safe Operating Area

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



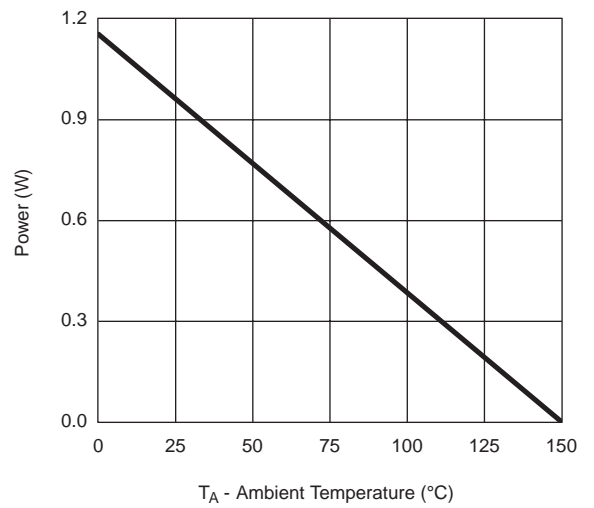
T_C - Case Temperature (°C)

Current Derating*



T_C - Case Temperature (°C)

Power Derating, Junction-to-Case

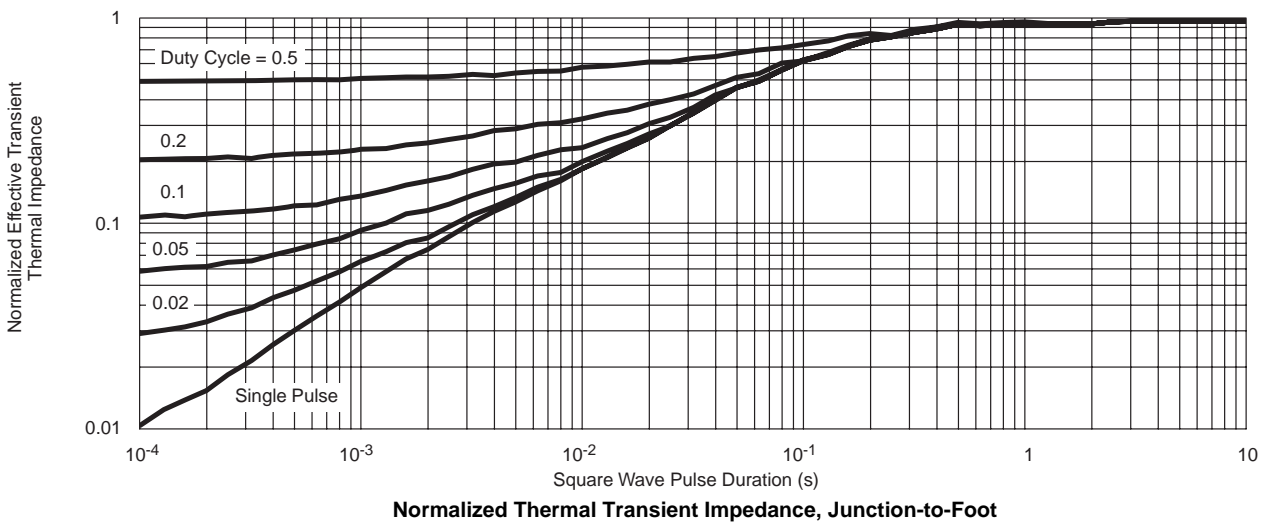
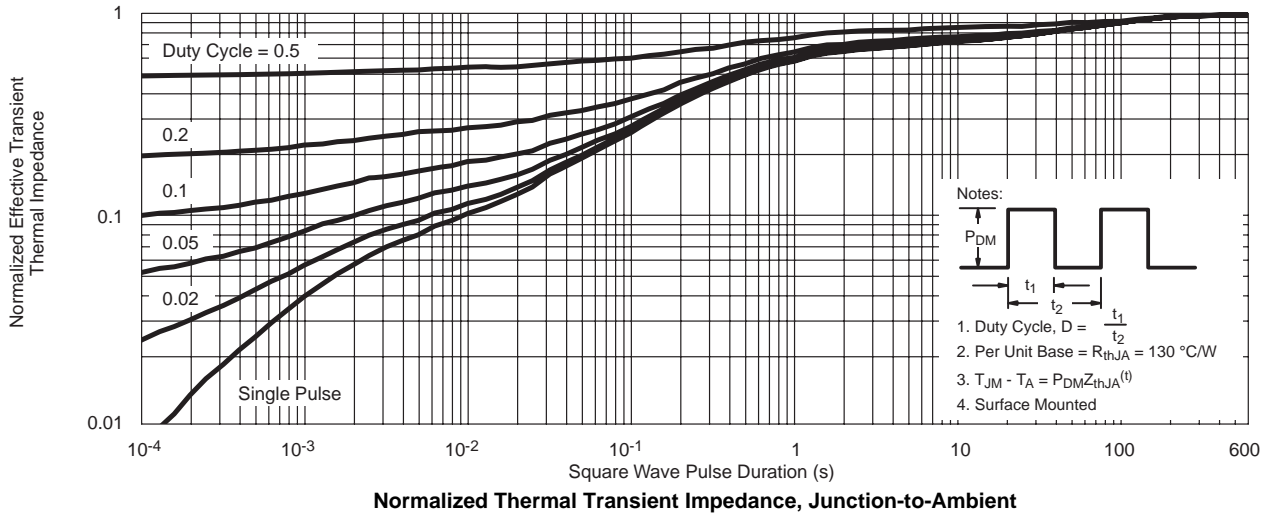


T_A - Ambient Temperature (°C)

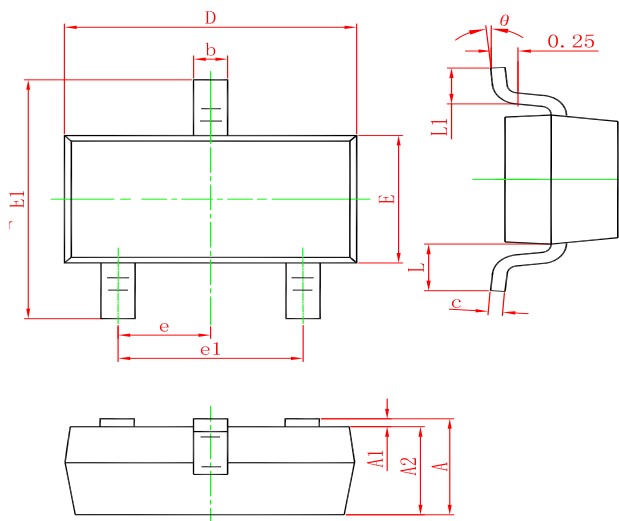
Power Derating, Junction-to-Ambient

* 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.

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

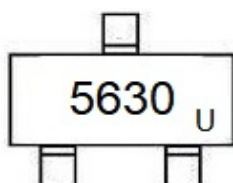


SOT-23 PACKAGE OUTLINE DIMENSIONS



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
UMW FDN5630	SOT-23	3000	Tape and reel