

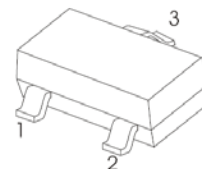
FEATURES

- $V_{DS} (V) = 20V$
- $I_D = 6 A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 28m\Omega$ ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 42m\Omega$ ($V_{GS} = 2.5V$)
- $R_{DS(ON)} < 50m\Omega$ ($V_{GS} = 1.8V$)

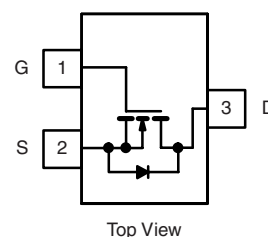
APPLICATIONS

- DC/DC Converters
- Load Switch for Portable Applications

SOT - 23



1. GATE
2. SOURCE
3. DRAIN



ABSOLUTE MAXIMUM RATINGS

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$)	I_D	6^a	A
		5.1	
		$5^{b, c}$	
		$4^{b, c}$	
Pulsed Drain Current	I_{DM}	20	
Continuous Source-Drain Diode Current	I_S	1.75	
		$1.04^{b, c}$	
Maximum Power Dissipation	P_D	2.1	W
		1.3	
		$1.25^{b, c}$	
		$0.8^{b, c}$	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^{\circ}\text{C}$
Soldering Recommendations (Peak Temperature)		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R_{thJA}	80	100	$^{\circ}\text{C/W}$
Maximum Junction-to-Foot (Drain)	R_{thJF}	40	60	

Notes:

- Package limited
- Surface Mounted on 1" x 1" FR4 board.
- $t = 5\text{ s}$.
- Maximum under steady state conditions is $125\text{ }^{\circ}\text{C/W}$.
- Based on $T_C = 25\text{ }^{\circ}\text{C}$.

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

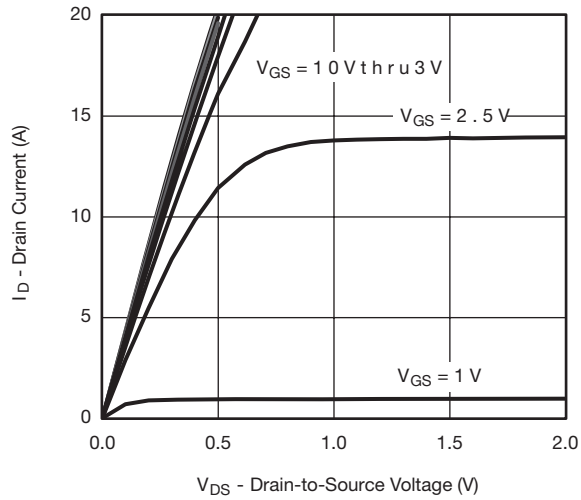
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	20			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		25		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 2.6		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.45		1.0	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 8 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 70 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ 5 V, V _{GS} = 4.5 V	20			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 5.0 A		28		mΩ
		V _{GS} = 2.5 V, I _D = 4.7 A		42		
		V _{GS} = 1.8 V, I _D = 4.3 A		50		
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 5.0 A		24		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		865		pF
Output Capacitance	C _{oss}			105		
Reverse Transfer Capacitance	C _{rss}			55		
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 5 V, I _D = 5.0 A		12	18	nC
		V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 5.0 A		8.8	14	
Gate-Source Charge	Q _{gs}			1.1		
Gate-Drain Charge	Q _{gd}			0.7		
Gate Resistance	R _g	f = 1 MHz	0.5	2.4	4.8	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 2.2 Ω I _D ≅ 4 A, V _{GEN} = 4.5 V, R _g = 1 Ω		8	16	ns
Rise Time	t _r			17	26	
Turn-Off Delay Time	t _{d(off)}			31	47	
Fall Time	t _f			8	16	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 2.2 Ω I _D ≅ 4 A, V _{GEN} = 5 V, R _g = 1 Ω		5	10	
Rise Time	t _r			13	20	
Turn-Off Delay Time	t _{d(off)}			21	32	
Fall Time	t _f			6	12	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			1.75	A
Pulse Diode Forward Current	I _{SM}				20	
Body Diode Voltage	V _{SD}	I _S = 4 A, V _{GS} = 0 V		0.75	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 4 A, dI/dt = 100 A/μs, T _J = 25 °C		12	20	ns
Body Diode Reverse Recovery Charge	Q _{rr}			5	10	nC
Reverse Recovery Fall Time	t _a			7		ns
Reverse Recovery Rise Time	t _b			5		

Notes:

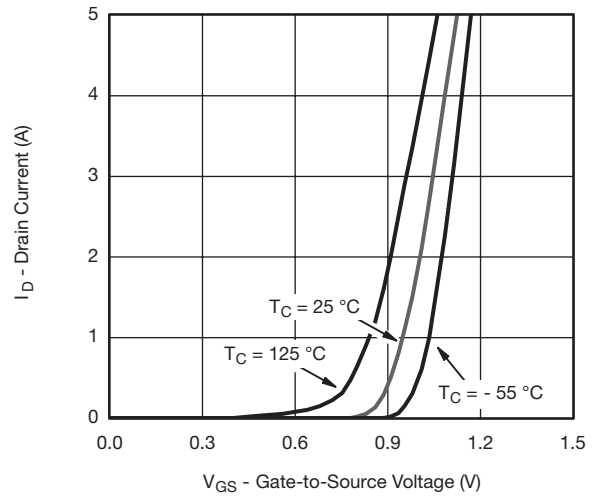
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

b. Guaranteed by design, not subject to production testing.

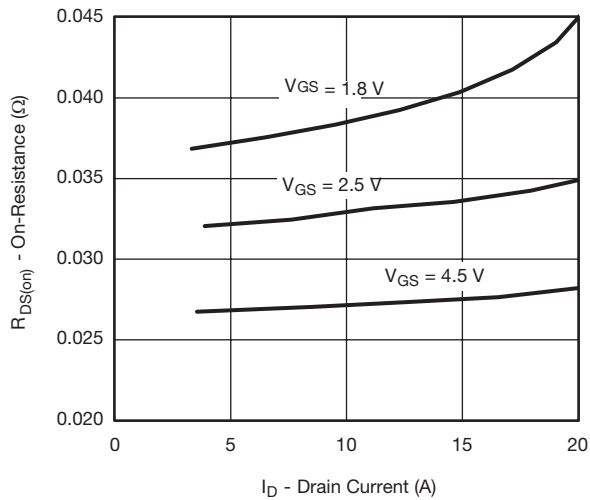
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



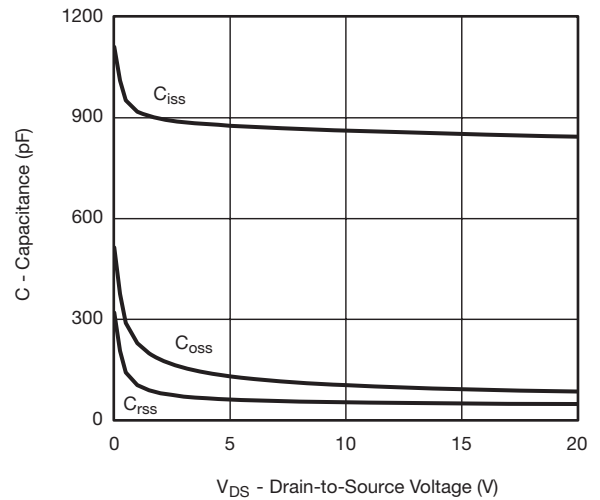
Output Characteristics



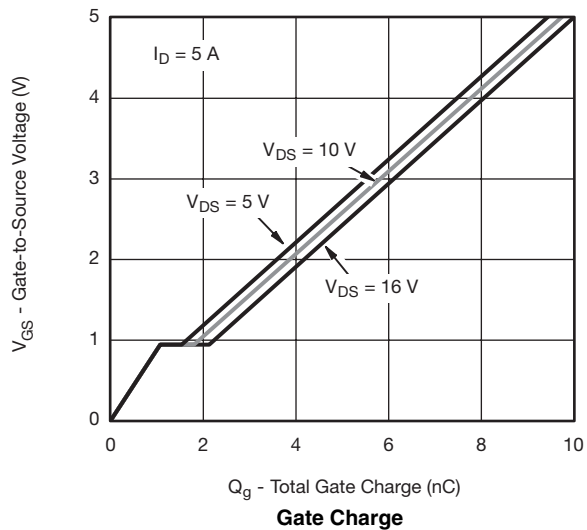
Transfer Characteristics



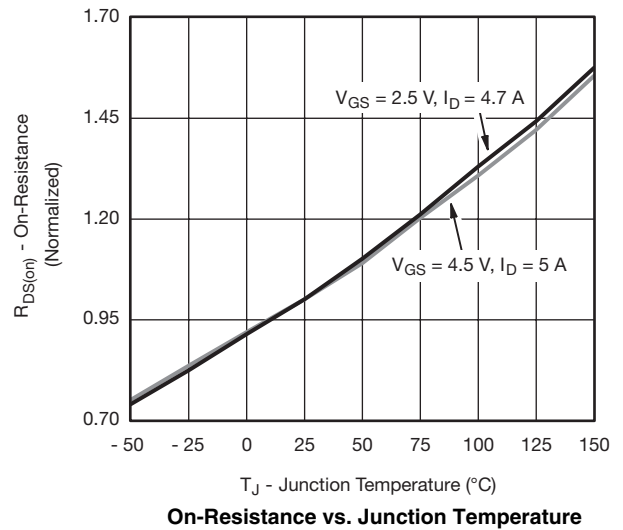
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

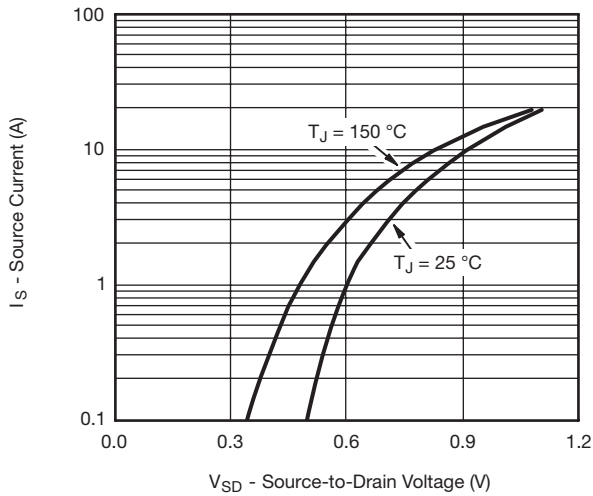


Gate Charge

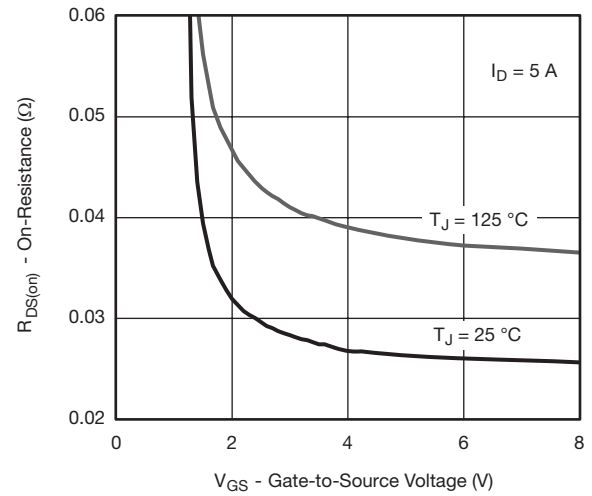


On-Resistance vs. Junction Temperature

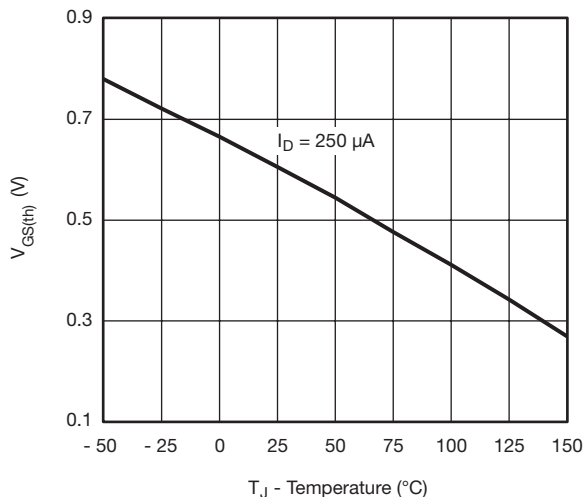
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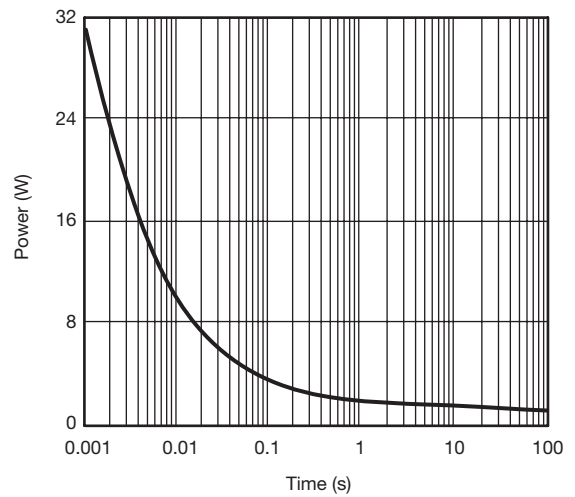
Source-Drain Diode Forward Voltage



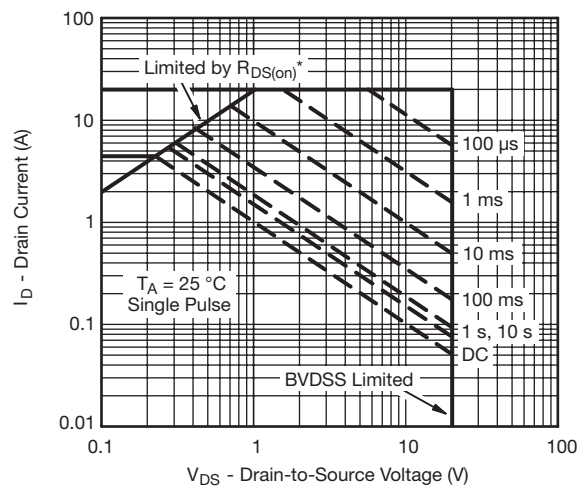
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



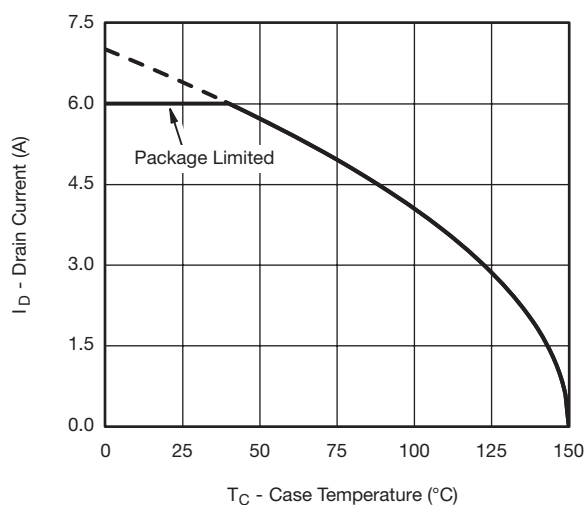
Single Pulse Power (Junction-to-Ambient)



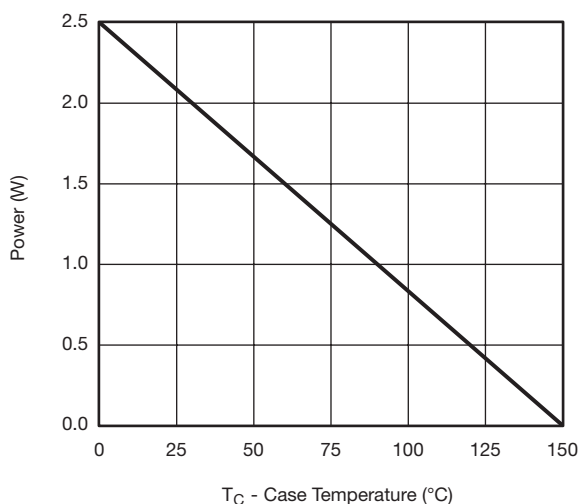
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

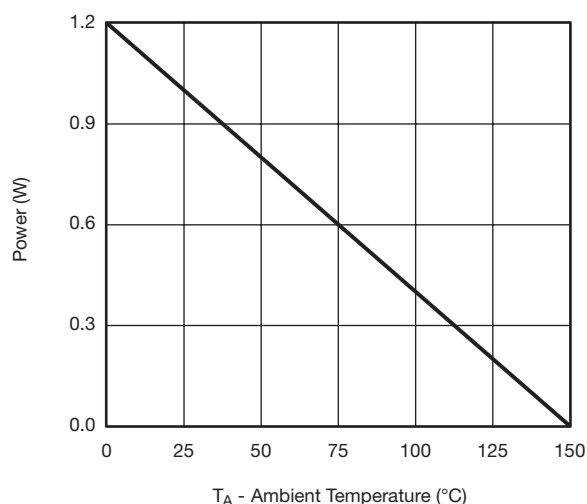
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*



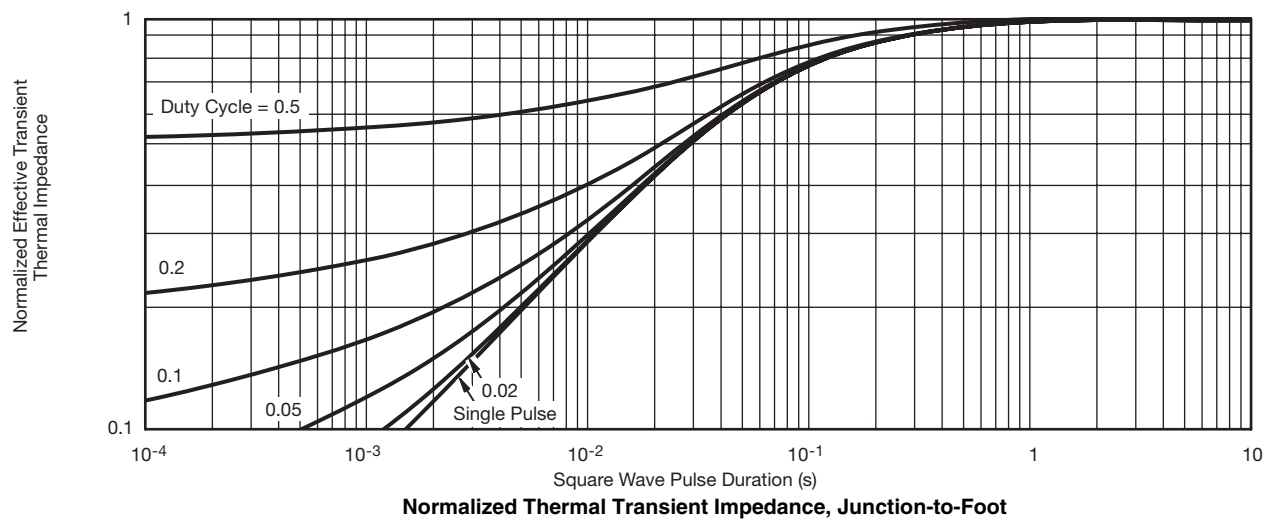
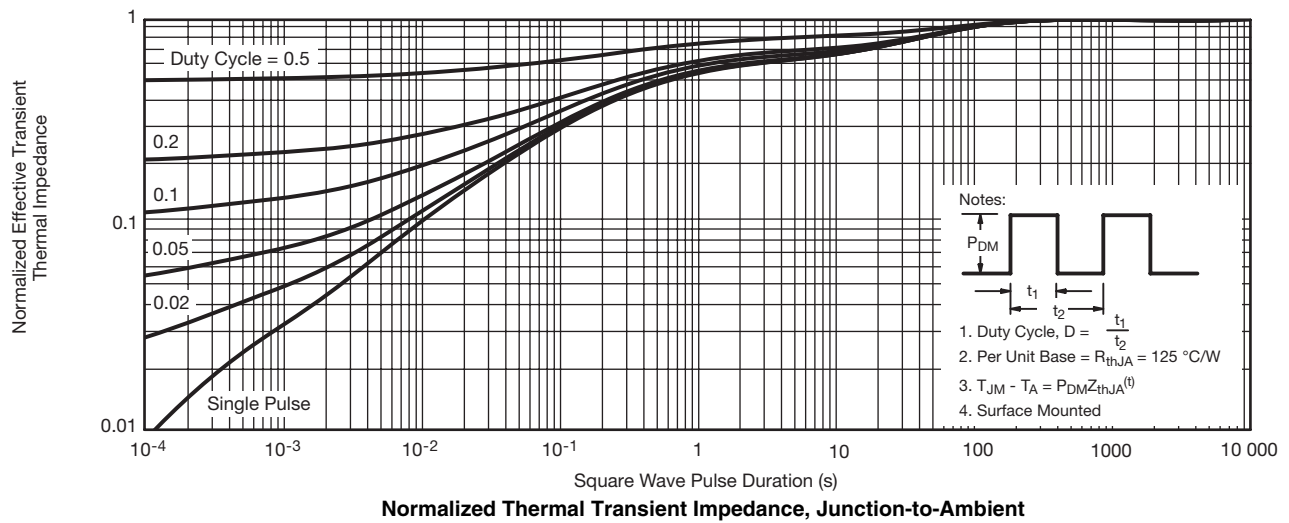
Power Derating, Junction-to-Foot



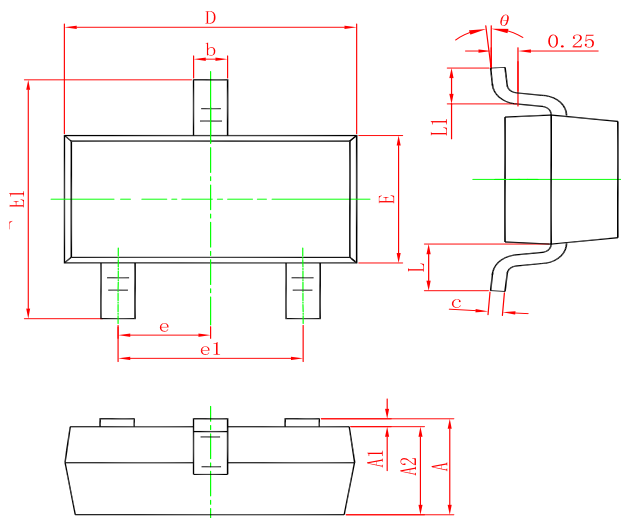
Power Derating, Junction-to-Ambient

* 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.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

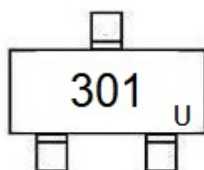


SOT-23 PACKAGE OUTLINE DIMENSIONS



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 FDV301N	SOT-23	3000	Tape and reel