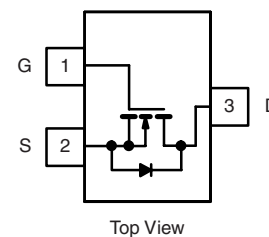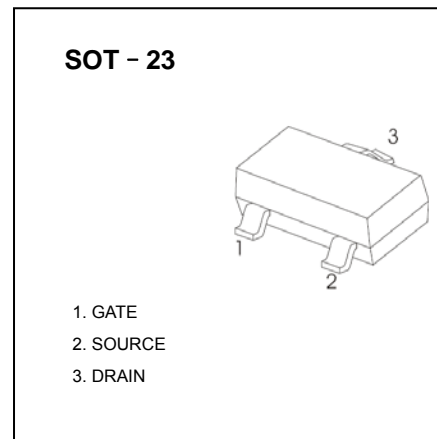**EVVOSEMI**
THINK CHANGE DO

FEATURES

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

APPLICATIONS

- DC/DC Converters
- Load Switch for Portable Applications

SOT－23

1. GATE
2. SOURCE
3. DRAIN

Top View

ABSOLUTE MAXIMUM RATINGS T_A = 25 °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 °C)	T_C = 25 °C	I_D	6[a]	A
	T_C = 70 °C		5.1	
	T_A = 25 °C		5[b, c]	
	T_A = 70 °C		4[b, c]	
Pulsed Drain Current		I_{DM}	20	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	1.75	
	T_A = 25 °C		1.04[b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	2.1	W
	T_C = 70 °C		1.3	
	T_A = 25 °C		1.25[b, c]	
	T_A = 70 °C		0.8[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)			260	

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b, d]	t ≤ 5 s	R_{thJA}	80	100	°C/W
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	40	60	

Notes:
a. Package limited
b. Surface Mounted on 1" x 1" FR4 board.
c. t = 5 s.
d. Maximum under steady state conditions is 125 °C/W.
e. Based on T_C = 25 °C.

SPECIFICATIONS T_J = 25 °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	$\Delta V_{DS}/T_J$	I_D = 250 µA		25		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 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]	$I_{D(on)}$	$V_{DS} \leq$ 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 $I_D \cong$ 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 $I_D \cong$ 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 µs, duty cycle $\leq$ 2 %
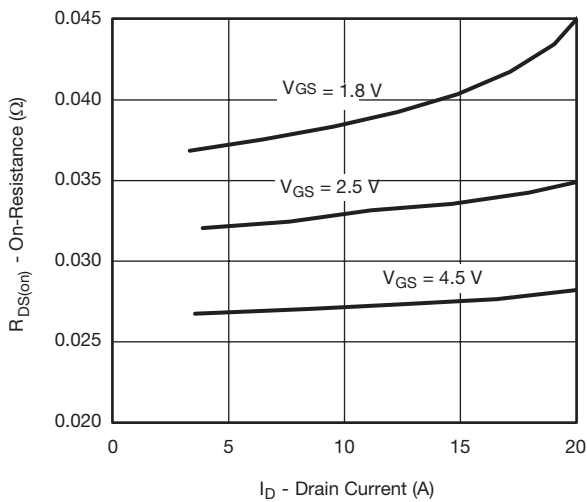b. Guaranteed by design, not subject to production testing.
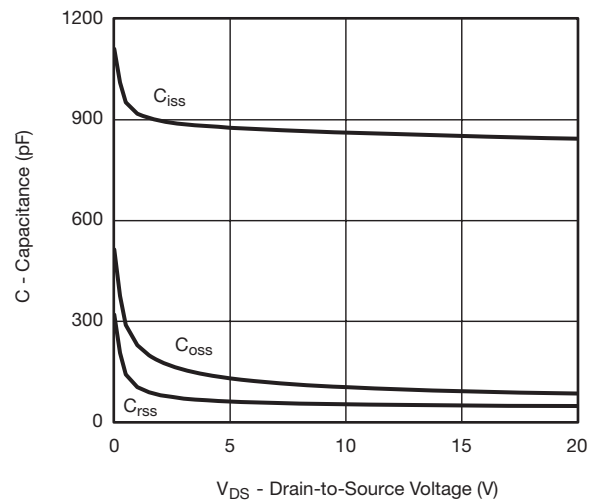
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted
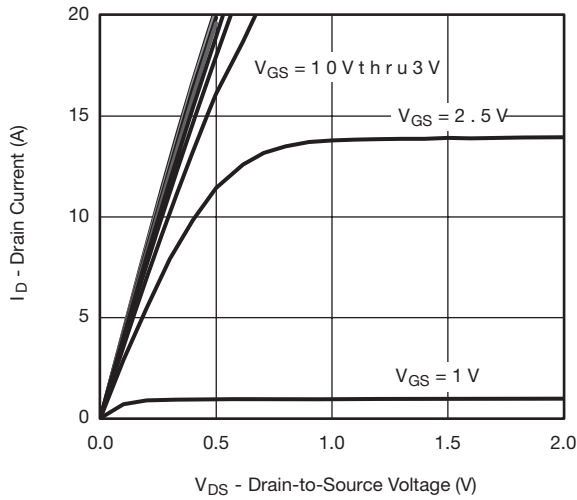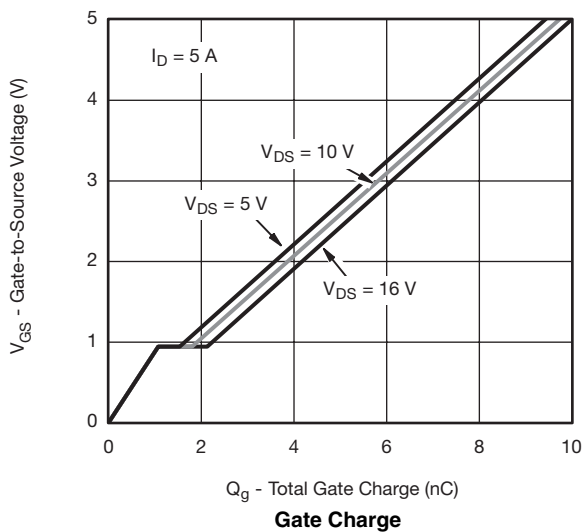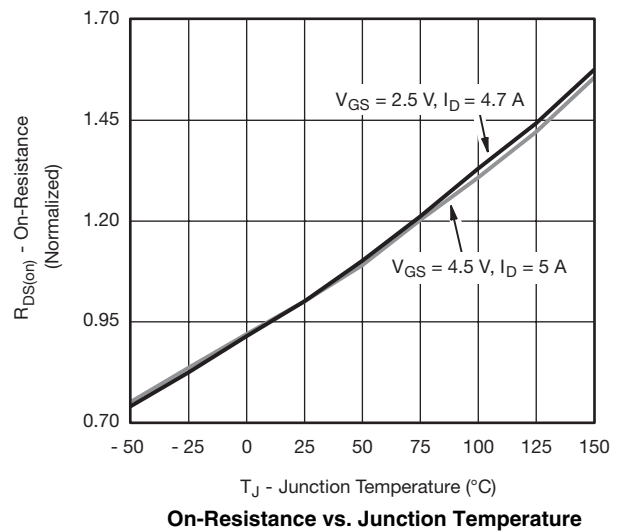

Output Characteristics
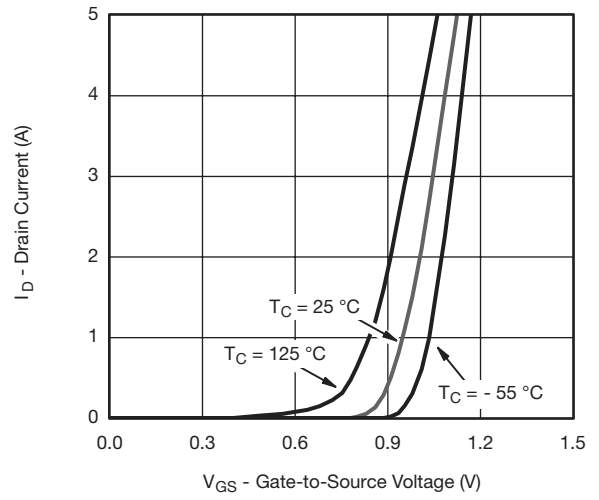
Transfer Characteristics

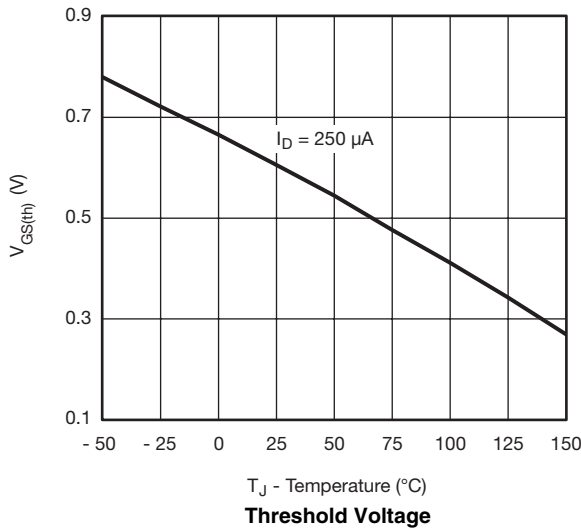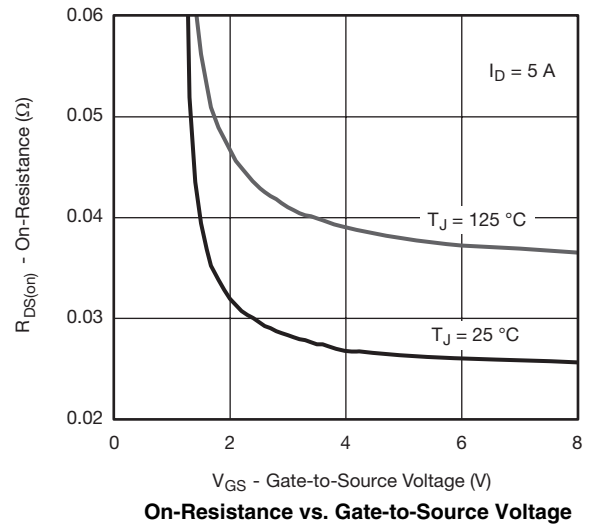**On-Resistance vs. Drain Current and Gate Voltage**

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 (Junction-to-Ambient)
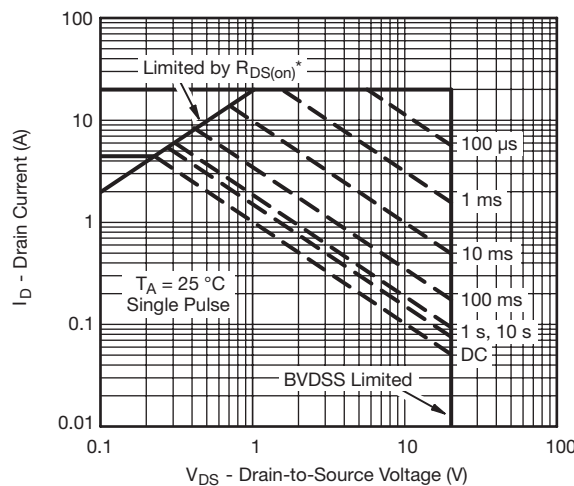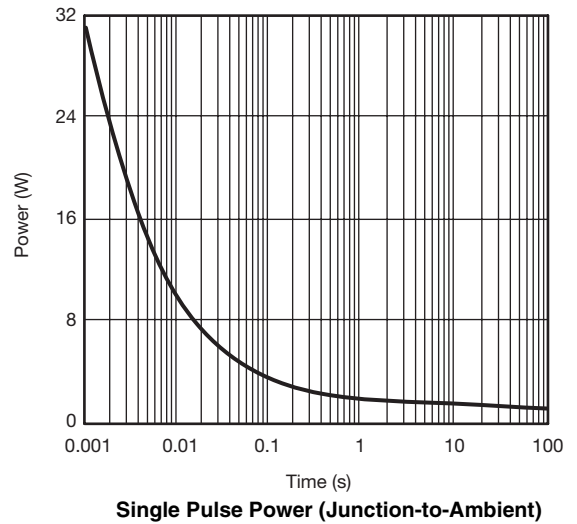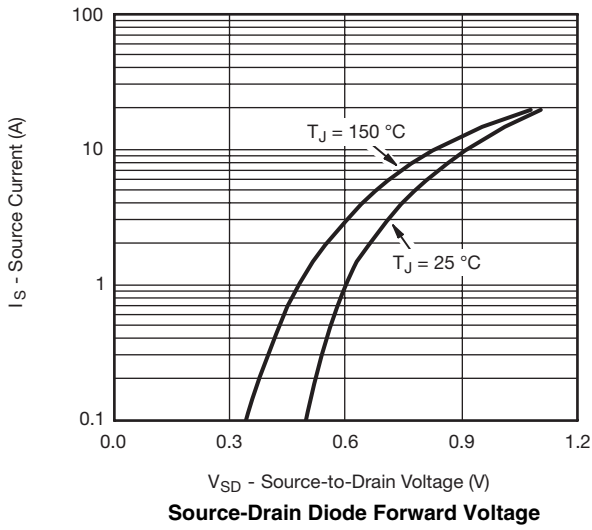
$* V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
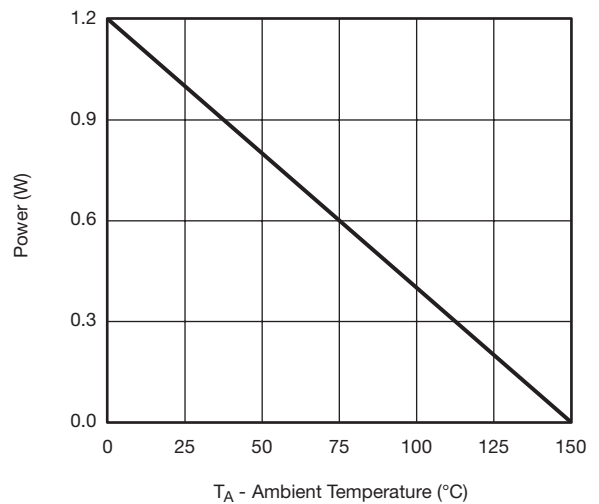**Safe Operating Area, Junction-to-Ambient**

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted
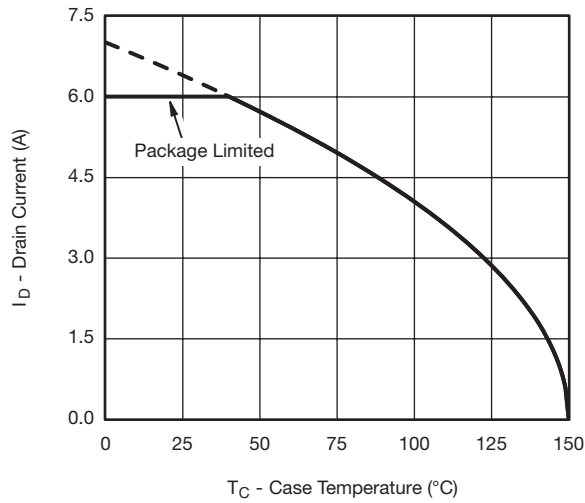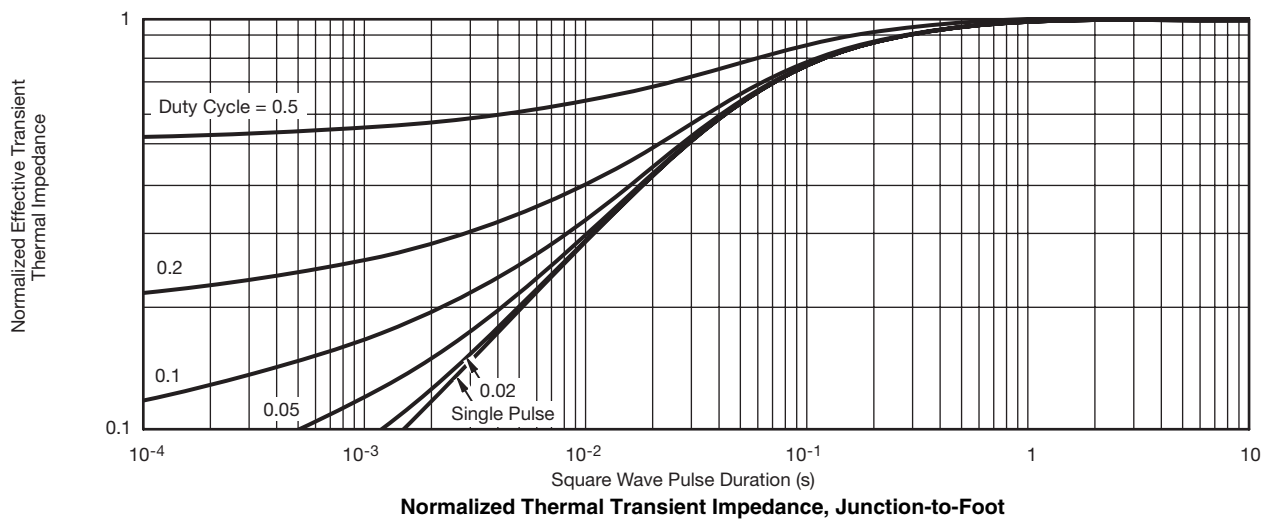

Current Derating*
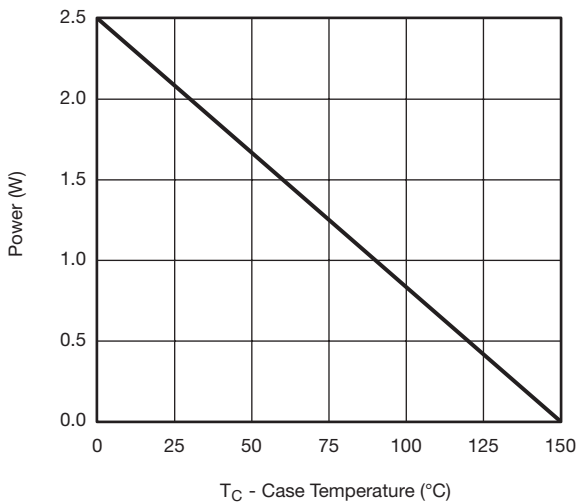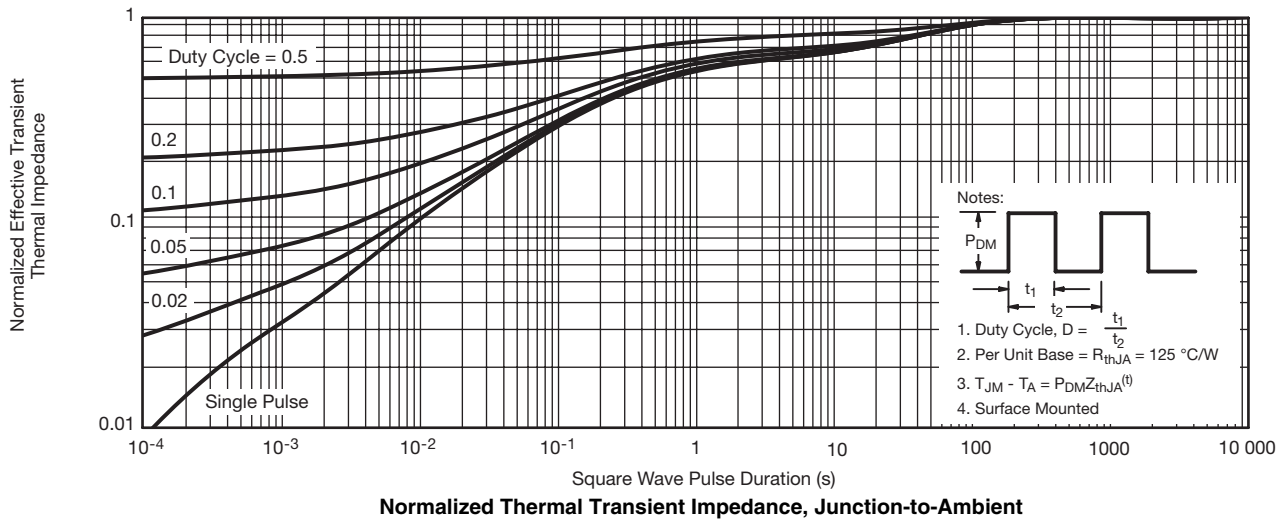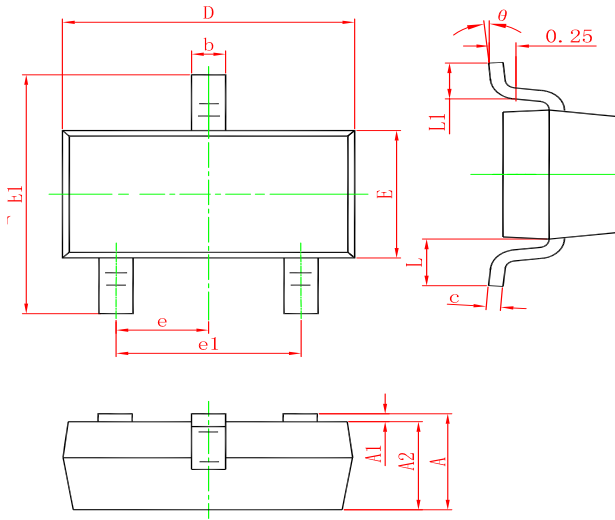

Power Derating, Junction-to-Foot

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

Notes:

1. Duty Cycle, D = $\frac{t_1}{t_2}$
2. Per Unit Base = R_{thJA} = 125 °C/W
3. $T_{JM} - T_A = P_{DM}Z_{thJA}^{(t)}$
4. Surface Mounted

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
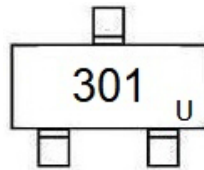
Ordering information

Order code	Package	Baseqty	Deliverymode
FDV301N	SOT-23	3000	Tape and reel