



Features

- High power and current handing capability
- Lead free product is acquired
- Surface mount package

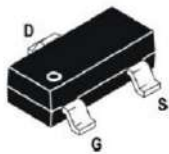
Application

- Motor control and drive
- Battery management
- UPS (Uninterruptible Power Supplies)

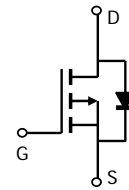
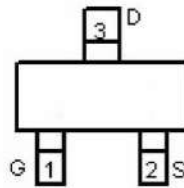
Product Summary

V_{DS}	-20	V
$R_{DS(on),TYP} @ V_{GS}=-4.5V$	45	mΩ
I_D	-5.4	A

top view



SOT-23



P-Channel

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

parameter			Limit	Unit
Drain-Source Voltage		V_{DS}	- 20	V
Gate-Source Voltage		V_{GS}	± 12	
Continuous Drain Current ($T_J = 150\text{ }^\circ\text{C}$)	$T_C = 25\text{ }^\circ\text{C}$	I_D	- 5.4	A
	$T_C = 70\text{ }^\circ\text{C}$		- 4.3 T_A	
	= 25 $^\circ\text{C}$		- 4.1 ^{a, b} T_A	
	= 70 $^\circ\text{C}$		- 3.3 ^{a, b}	
Pulsed Drain Current		I_{DM}	- 21.6	
Continuous Source-Drain Diode Current	$T_C = 25\text{ }^\circ\text{C}$	I_S	- 5.4	
	$T_A = 25\text{ }^\circ\text{C}$		- 0.8 ^{a, b}	
Maximum Power Dissipation	$T_C = 25\text{ }^\circ\text{C}$	P_D	1.7	W
	$T_C = 70\text{ }^\circ\text{C}$		1.1	
	$T_A = 25\text{ }^\circ\text{C}$		0.96 ^{a, b}	
	$T_A = 70\text{ }^\circ\text{C}$		0.62 ^{a, b}	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 50 to 150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature)			260	

Notes:

- a. Surface Mounted on 1" x 1" FR4 board.
 b. $t = 10\text{ s}$.

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{a, b}	$t \leq 10\text{ s}$	R_{thJA}	100	130	$^\circ\text{C/W}$
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	60	75	

Notes:

- a. Surface Mounted on 1" x 1" FR4 board.
 b. Maximum under Steady State conditions is 175 $^\circ\text{C/W}$.

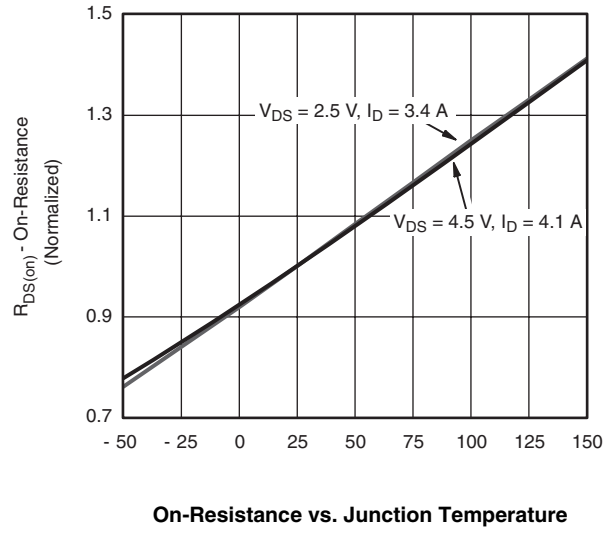
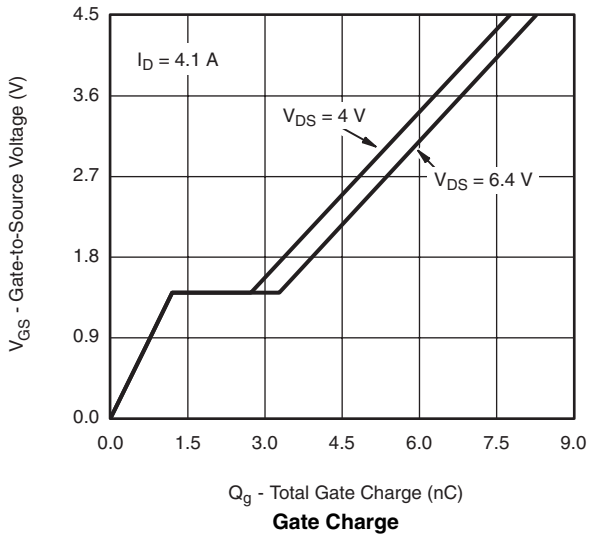
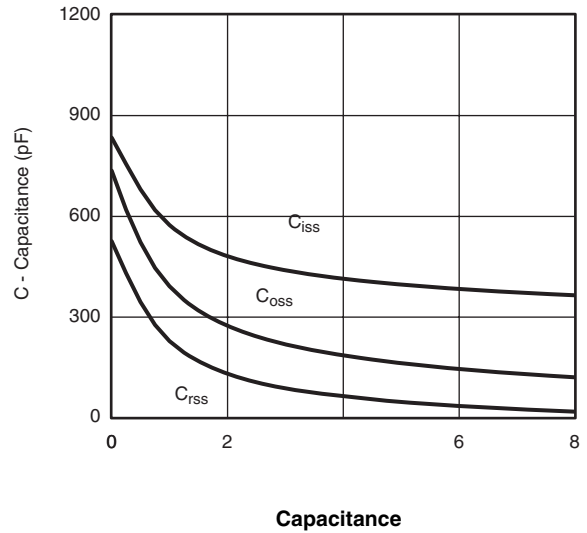
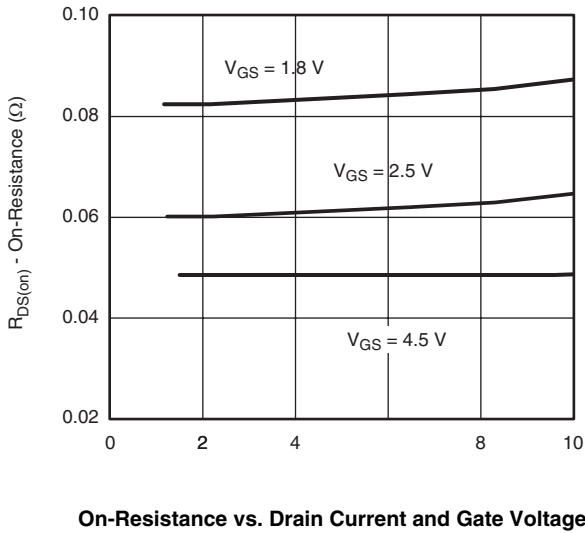
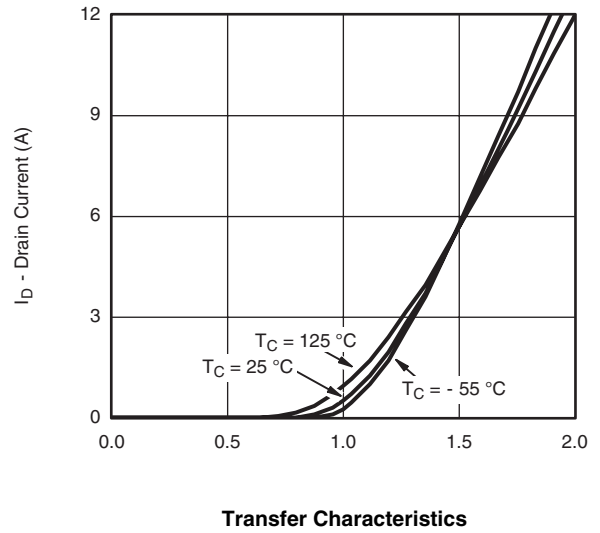
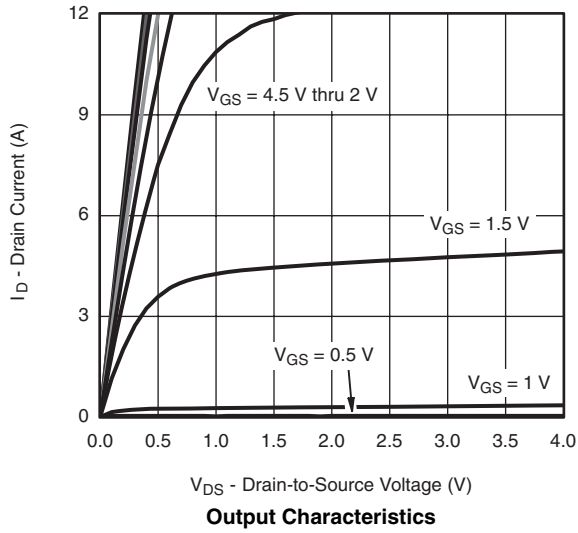
SPECIFICATIONS $T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-20			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-55		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		2.1			
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-0.45		-0.8	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 8\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -16\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -4.5\text{ V}$	-5			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -4.5\text{ V}, I_D = -4.1\text{ A}$		45	50	m Ω
		$V_{GS} = -2.5\text{ V}, I_D = -3.4\text{ A}$		60	75	
		$V_{GS} = -1.8\text{ V}, I_D = -2.0\text{ A}$		84	88	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -5\text{ V}, I_D = -4.1\text{ A}$		8		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -4\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		416		pF
Output Capacitance	C_{oss}		163			
Reverse Transfer Capacitance	C_{rss}		107			
Total Gate Charge	Q_g	$V_{DS} = -4\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -4.1\text{ A}$		7.8	15	nC
		$V_{DS} = -4\text{ V}, V_{GS} = -2.5\text{ V}, I_D = -4.1\text{ A}$		4.5	9	
Gate-Source Charge	Q_{gs}	$V_{DS} = -4\text{ V}, V_{GS} = -2.5\text{ V}, I_D = -4.1\text{ A}$		1.2		
Gate-Drain Charge	Q_{gd}		1.6			
Gate Resistance	R_g	$f = 1\text{ MHz}$	1.4	7	14	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4\text{ V}, R_L = 1.2\text{ }\Omega$ $I_D \cong -3.3\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		13	20	ns
Rise Time	t_r		35	53		
Turn-Off Delay Time	$t_{d(off)}$		32	48		
Fall Time	t_f		10	20		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -4\text{ V}, R_L = 1.2\text{ }\Omega$ $I_D \cong -3.3\text{ A}, V_{GEN} = -8\text{ V}, R_g = 1\text{ }\Omega$		5	10	
Rise Time	t_r		11	17		
Turn-Off Delay Time	$t_{d(off)}$		22	33		
Fall Time	t_f		16	24		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			-5.4	A
Pulse Diode Forward Current ^a	I_{SM}				-10	
Body Diode Voltage	V_{SD}	$I_F = -3.3\text{ A}$		-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -3.3\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		33	50	ns
Body Diode Reverse Recovery Charge	Q_{rr}		14	21	nC	
Reverse Recovery Fall Time	t_a		14		ns	
Reverse Recovery Rise Time	t_b		19			

Notes:

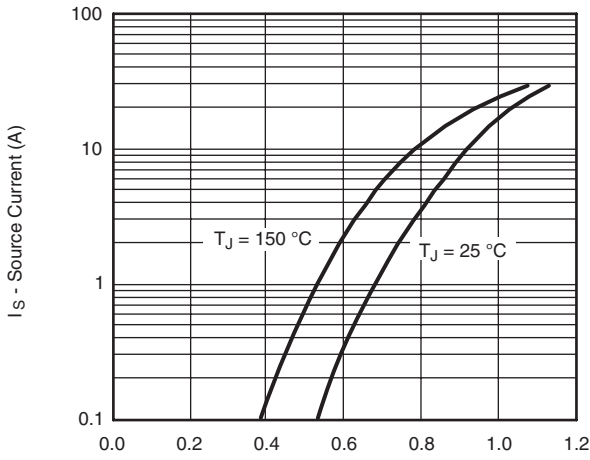
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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.

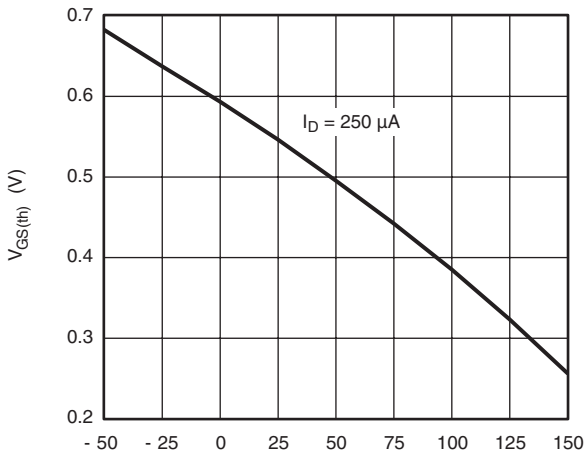
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



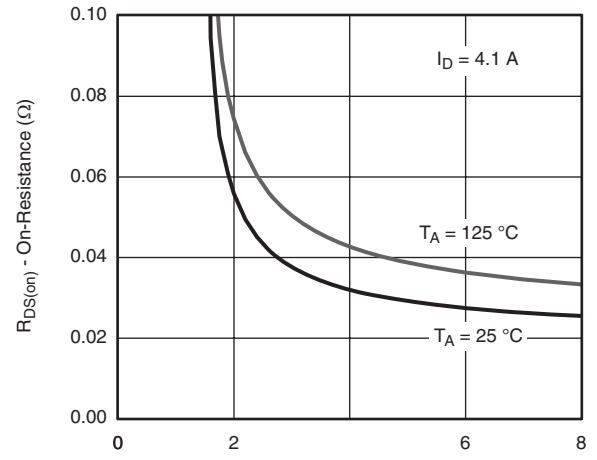
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



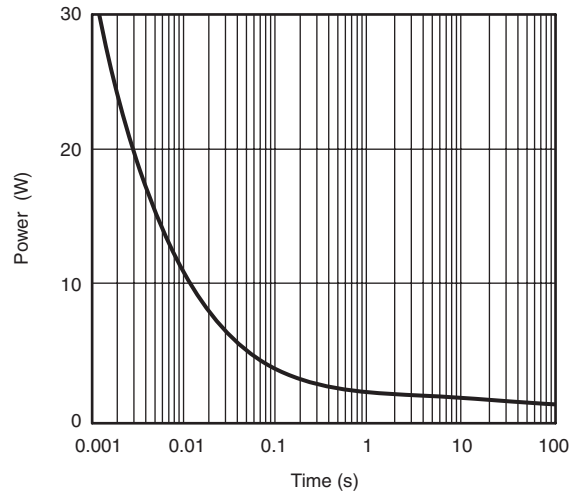
Source-Drain Diode Forward Voltage



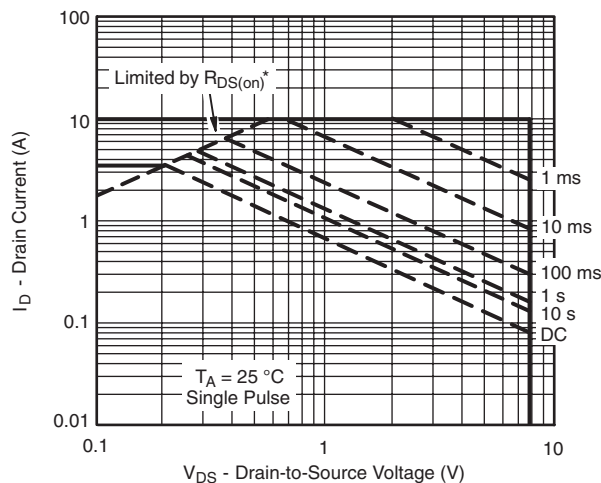
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



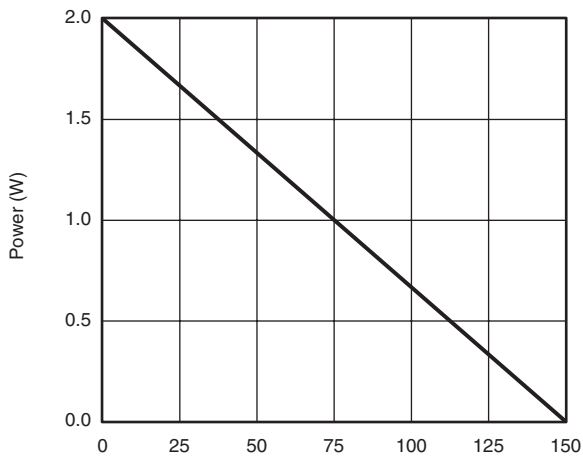
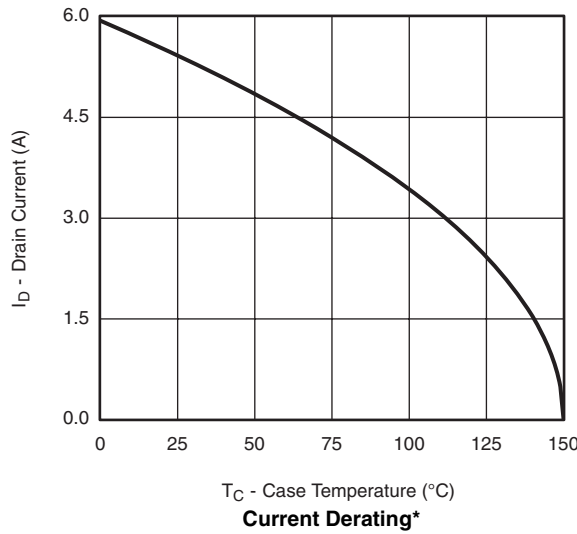
Single Pulse Power, Junction-to-Ambient



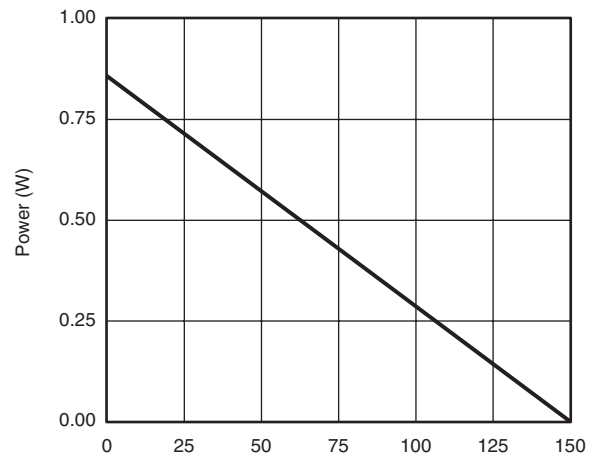
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



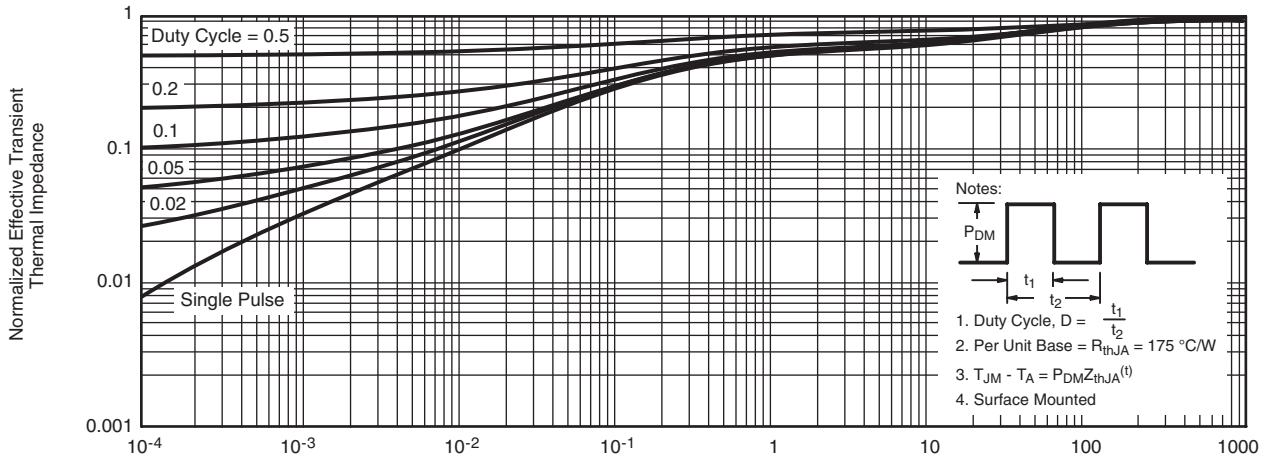
Power, Junction-to-Case



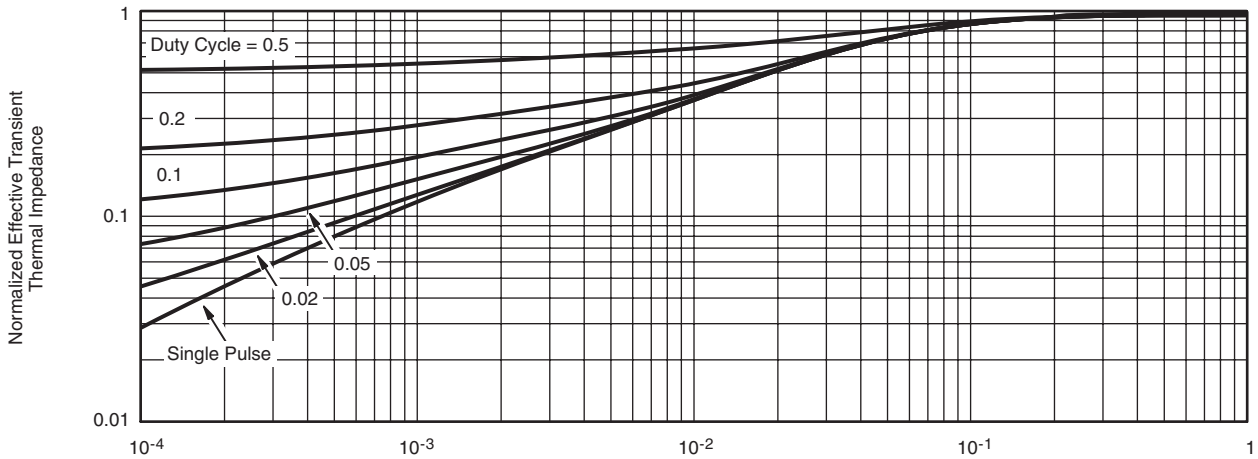
Power, Junction-to-Ambient

* 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



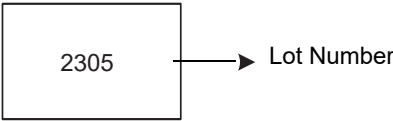
Normalized Thermal Transient Impedance, Junction-to-Ambient

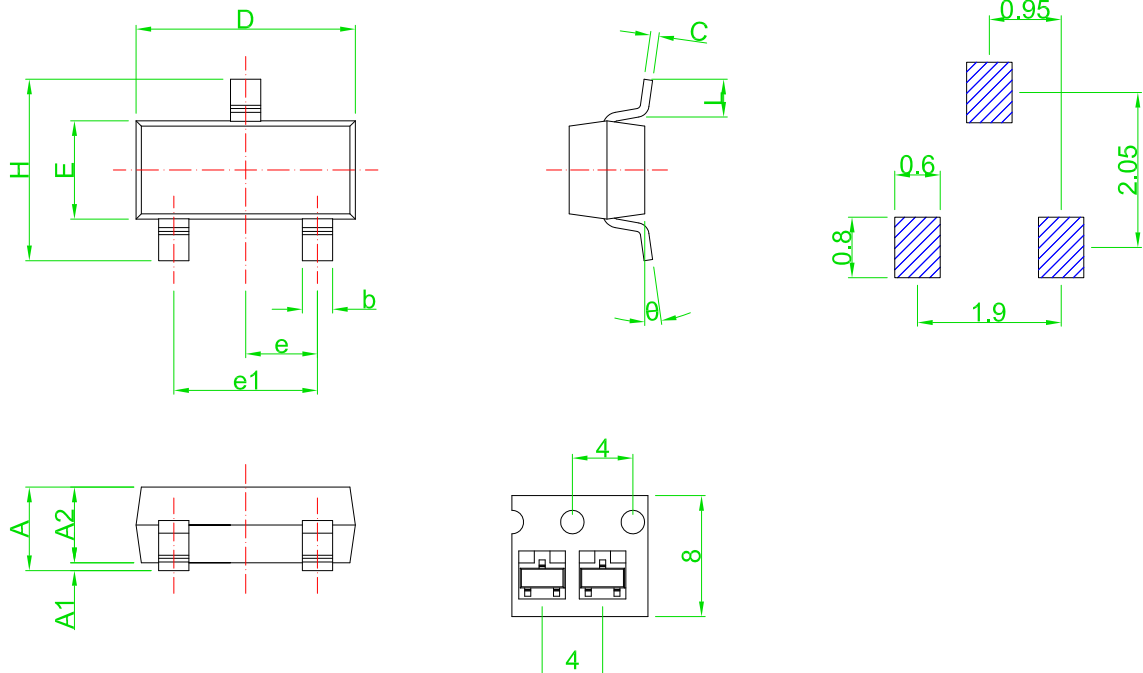


Normalized Thermal Transient Impedance, Junction-to-Foot

Ordering and Marking Information

Ordering Device No.	Marking	Package	Packing	Quantity
ASDM2305ZA-R	2305	SOT-23	Tape&Reel	3000/Reel

PACKAGE	MARKING
SOT-23	



Recommended Land Pattern

Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.90	1.15	0.035	0.045
A1	0.00	0.10	0.000	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.55	0.012	0.022
C	0.08	0.15	0.003	0.006
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
e	0.95 TYP		0.037 TYP	
e1	1.80	2.00	0.071	0.079
H	2.25	2.55	0.089	0.100
L	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

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