

1.Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency of DC/DC converters using either synchronous or conventional switching PWM controllers

2.Features

- $V_{DS(V)}=60V$
- $I_D=1.9A(V_{GS}=10V)$
- $I_D=1.7A(V_{GS}=4.5V)$
- $R_{DS(ON)}<85m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<96m\Omega(V_{GS}=4.5V)$

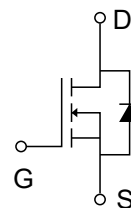
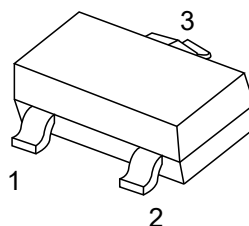
3.Applications

- Battery Switch
- DC/DC Converter

4.Pinning information

Pin	Symbol	Description
1	G	GATE
2	S	SOURCE
3	D	DRAIN

SOT-23



5.Maximum ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Parameter	Symbol	Ratings	Units
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Drain Current - Continuous (Note 1a)	I_D	1.7	A
- Pulsed		10	A
Power Dissipation for Single Operation (Note 1a)	P_D	0.5	W
(Note 1b)		0.46	W
Operating and Storage Junction Temperature Range	T_J, T_{STG}	-55 to 150	$^{\circ}C$



6.Thermal Characteristics

Parameter		Symbol	Ratings	Units
Thermal Resistance, Junction-to-Ambient	(Note 1a)	$R_{\theta JA}$	250	°C/W
Thermal Resistance, Junction-to-Case	(Note 1)	$R_{\theta JC}$	75	°C/W



7. Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{DS}=0\text{V}$, $I_D=250\mu\text{A}$	60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D=250\mu\text{A}$		55		mV/ $^{\circ}\text{C}$
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	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
		$V_{DS}=60\text{V}$, $V_{GS}=0\text{V}$, $T_J=55^{\circ}\text{C}$			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}	$V_{DS}=30\text{V}$, $V_{GS}=4.5\text{V}$		0.7		
Gate Drain Charge	Q_{gd}	$I_D=1.9\text{A}$		1		
Gate Resistance	R_g	$f=1\text{MHz}$	0.6	2.2	5.1	Ω
Turn-On DelayTime	$t_{D(on)}$	$V_{DD}=30\text{V}$, $R_L=20\Omega$ $I_D=1.5\text{A}$, $V_{GEN}=10\text{V}$ $R_g=1\Omega$		4	6	ns
Rise Time	t_r			10	15	
Turn-Off DelayTime	$t_{D(off)}$			10	15	
Fall Time	t_f			7	10.5	



Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=30V, R_L=20\Omega$ $I_D=1.5V, V_{GEN}=4.5V$ $R_g=1\Omega$		15	23	ns
Rise Time	t_r			16	24	ns
Turn-Off Delay Time	$t_{D(off)}$			11	17	ns
Fall Time	t_f			11	17	ns
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C=25^{\circ}C$			2.19	A
Pulse Diode Forward Current ^a	I_{SM}				7	A
Body Diode Voltage	V_{SD}	$I_S=1.5A$		0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=1.5A, dI/dt=100A/\mu s$ $T_J=25^{\circ}C$		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		ns

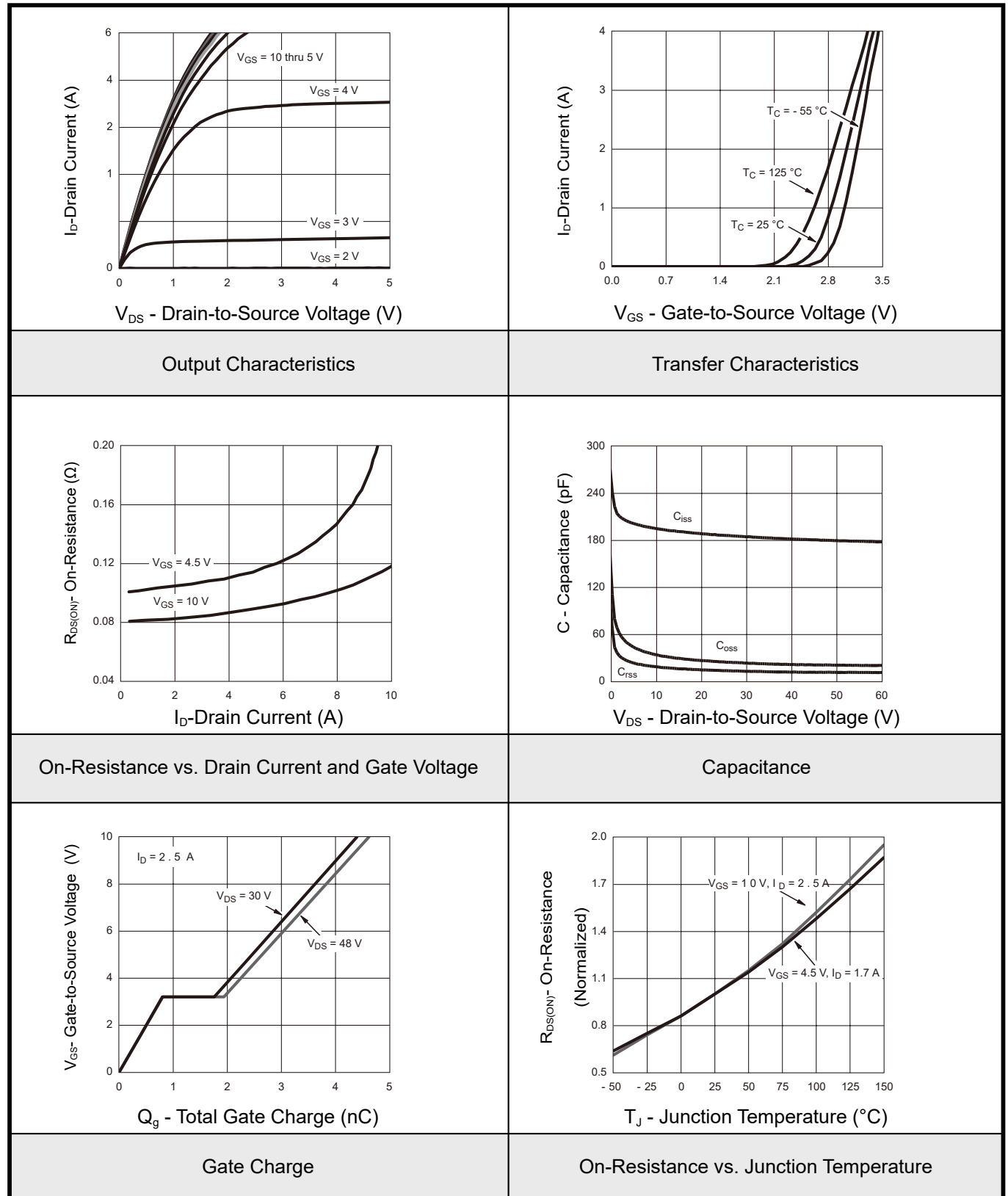
Notes:

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

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

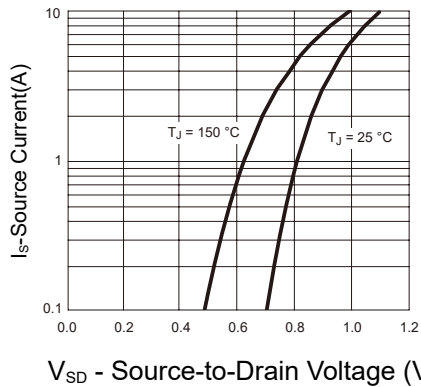


8.1 Typical Characteristics

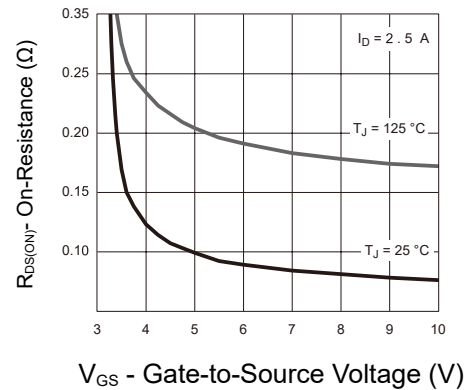




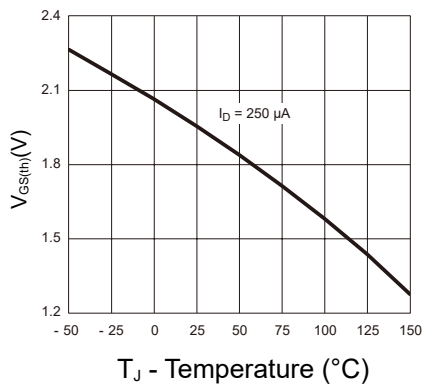
8.2 Typical Characteristics



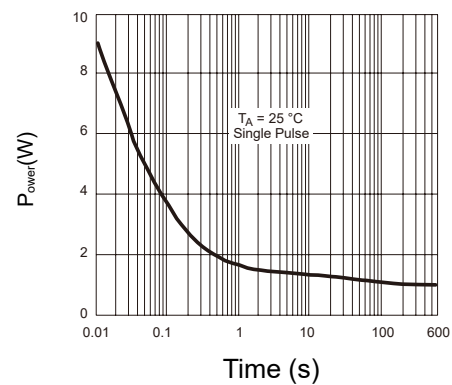
Source-Drain Diode Forward Voltage



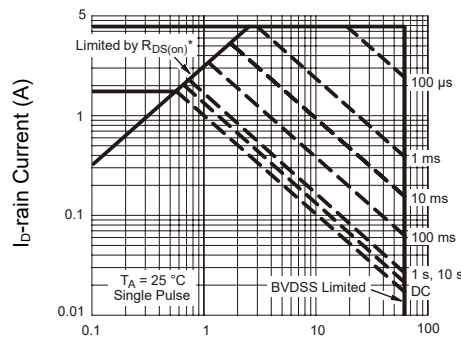
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



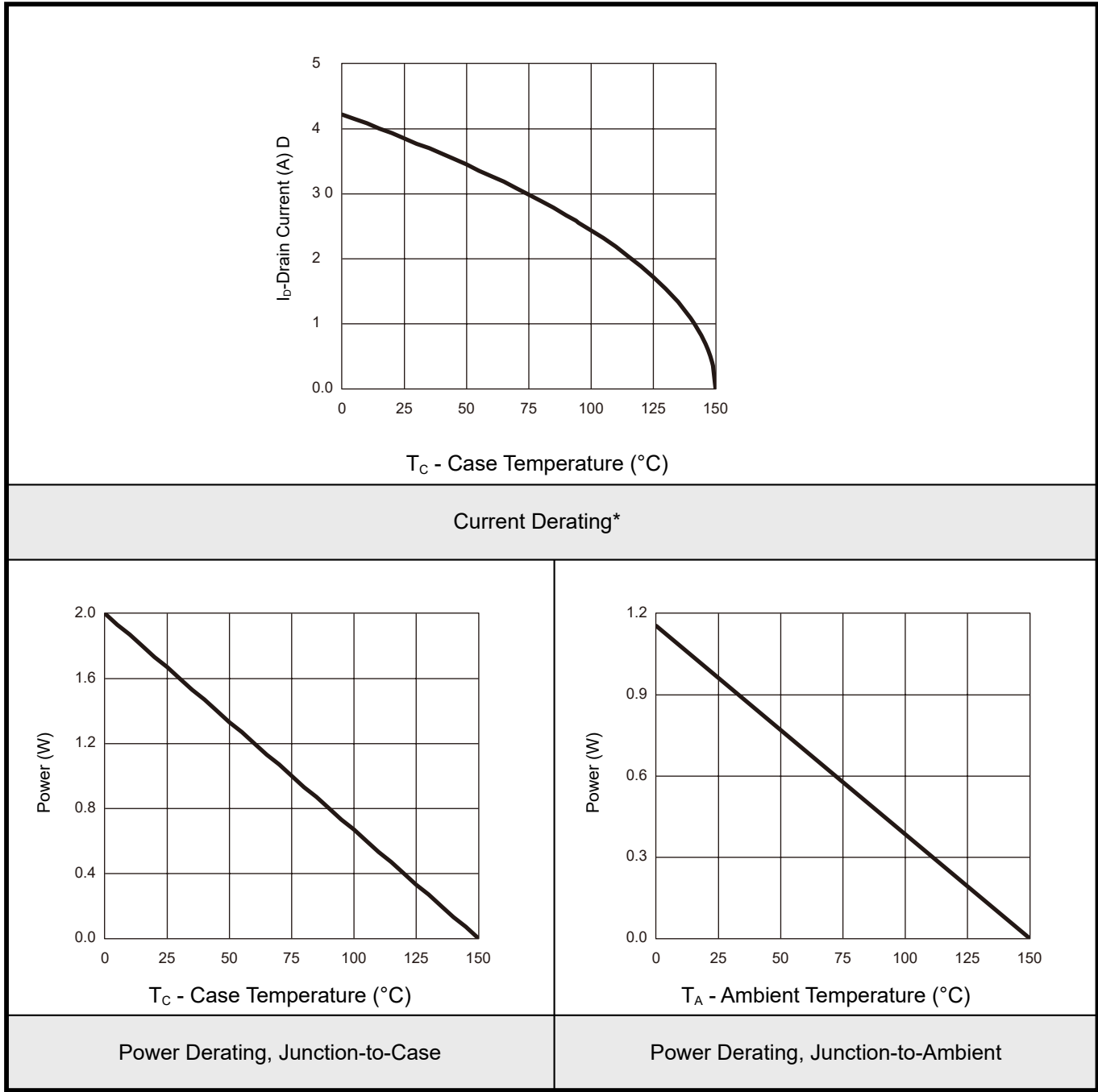
Single Pulse Power, Junction-to-Ambient


 V_{DS} - Drain-to-Source Voltage (V) * $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area



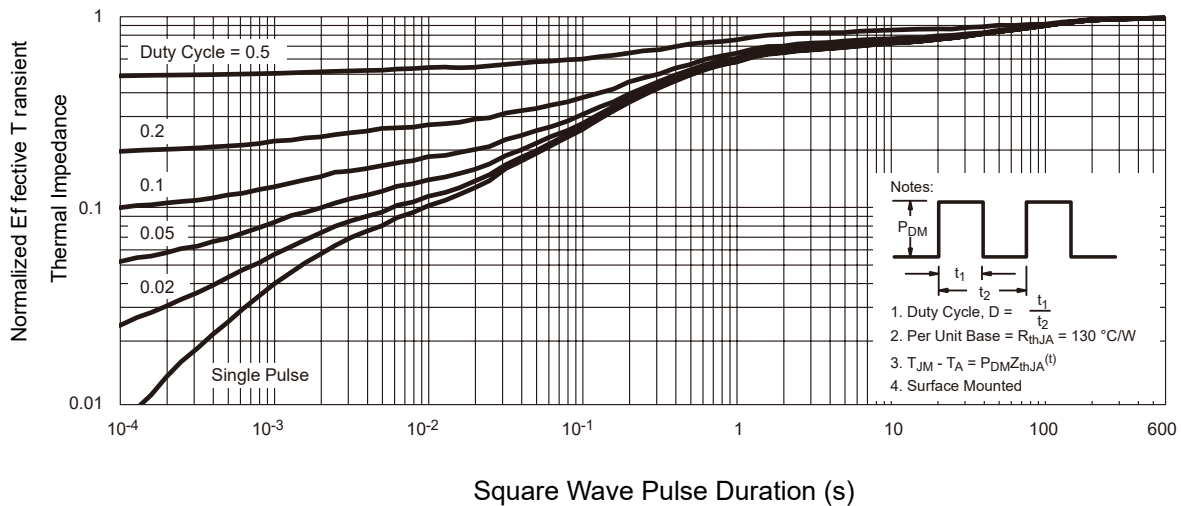
8.3Typical Characterisitics



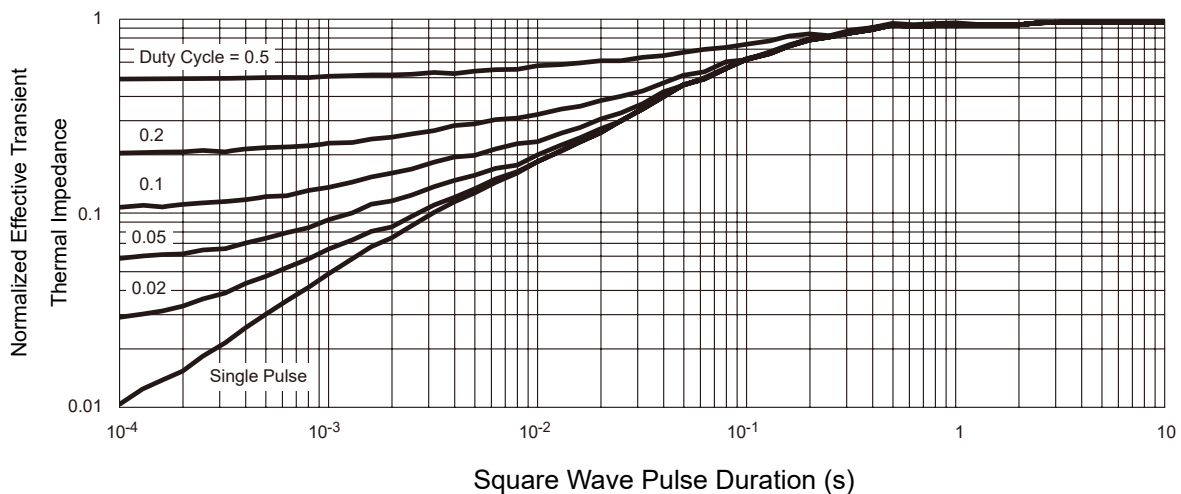
* The power dissipation P_D is based on $T_{J(max)} = 150\text{ }^{\circ}C$, using junction-to-case thermal resistance, and is more useful in settling the upperdissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the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



8.4 Typical Characteristics



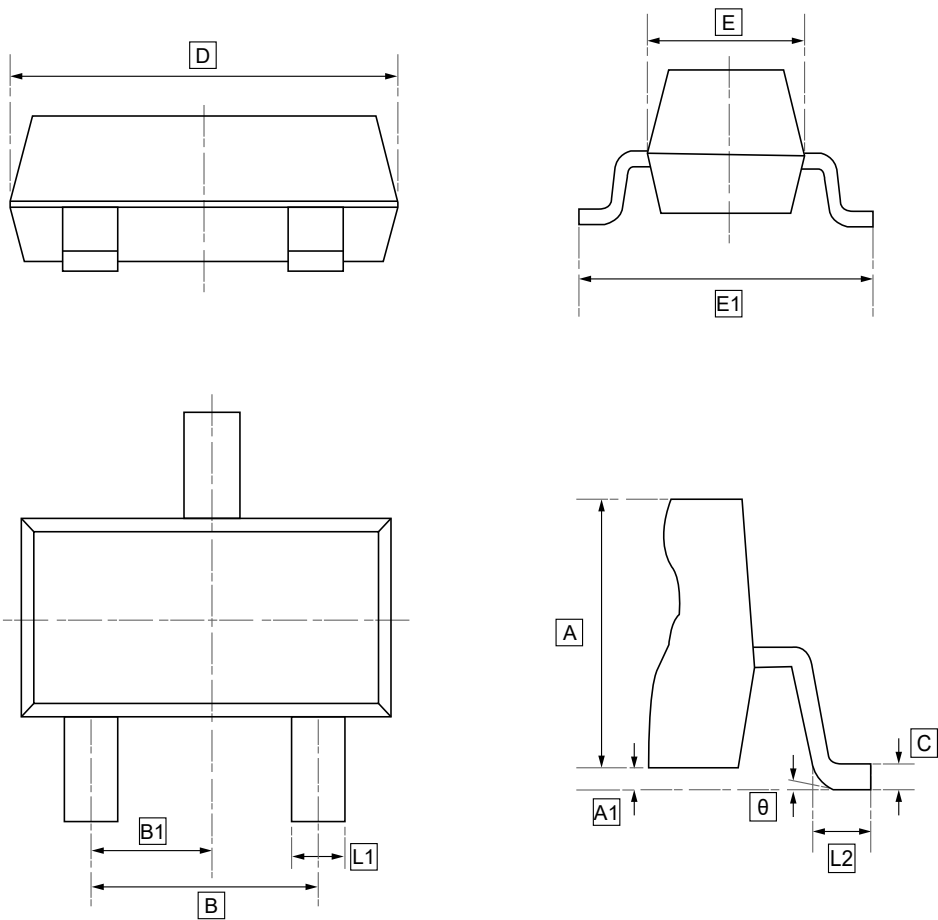
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot



9.SOT-23 Package Outline Dimensions

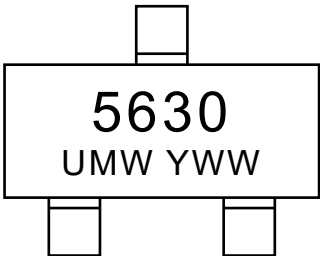


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	L1	L2	C	D	E	E1	B	B1	θ
Min	1.050	0.000	0.300	0.350	0.100	2.820	1.500	2.700	1.800	0.950	0°
Max	1.150	0.100	0.500	0.550	0.200	3.020	1.700	2.900	2.000	TYP	8°



10.Ordering information



YWW: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW FDN5630	SOT-23	3000	Tape and reel



11.Disclaimer

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