

N-Channel Enhancement Mode Power MOSFET

Description

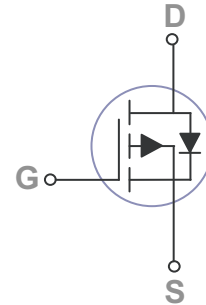
The RM6A5N30S6 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

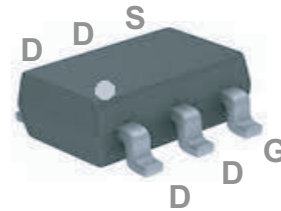
- $V_{DS} = 32V, I_D = 6.5A$
 $R_{DS(ON)} < 35 m\Omega @ V_{GS}=10V$
 $R_{DS(ON)} < 55 m\Omega @ V_{GS}=4.5V$
- High density cell design for ultra low R_{dson}
- Fully characterized Avalanche voltage and current

Application

- Power switching application
- Hard Switched and High Frequency Circuits
- Uninterruptible Power Supply
- Halogen-free
- P/N suffix V means AEC-Q101 qualified, e.g:RM6A5N30S6V



Schematic diagram



SOT-23-6 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
6A5N30	RM6A5N30S6	SOT-23-6	Ø180mm	8 mm	3000 units

Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	32	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	6.5	A
Drain Current-Continuous($T_C=70^\circ C$)	$I_D(70^\circ C)$	5.1	A
Pulsed Drain Current	I_{DM}	20	A
Maximum Power Dissipation	P_D	2.7	W
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 150	$^\circ C$

Thermal Characteristic

Thermal Resistance, Junction-to-Ambient ^(Note 2)	$R_{\theta JA}$	74	$^\circ C/W$
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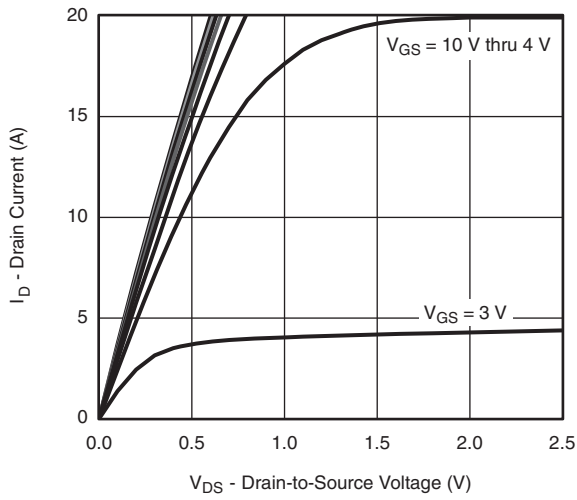
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	32	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.3	1.8	2.5	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=0.5A$	-	27	35	m Ω
		$V_{GS}=4.5V, I_D=0.5A$	-	40	55	
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=10A$	-	15	-	S
Dynamic Characteristics ^(Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	325	-	PF
Output Capacitance	C_{oss}		-	60	-	PF
Reverse Transfer Capacitance	C_{rss}		-	30	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, I_D=4A$ $V_{GEN}=4.5V, R_L=3.8\Omega$	-	12	18	nS
Turn-on Rise Time	t_r		-	13	20	nS
Turn-Off Delay Time	$t_{d(off)}$		-	16	25	nS
Turn-Off Fall Time	t_f		-	11	17	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=5A,$ $V_{GS}=4.5V$	-	2.8	4.2	nC
Gate-Source Charge	Q_{gs}		-	1.1	-	nC
Gate-Drain Charge	Q_{gd}		-	0.8	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=0.5A$	-	0.7	1.3	V
Diode Forward Current ^(Note 2)	I_S		-	-	1.3	A

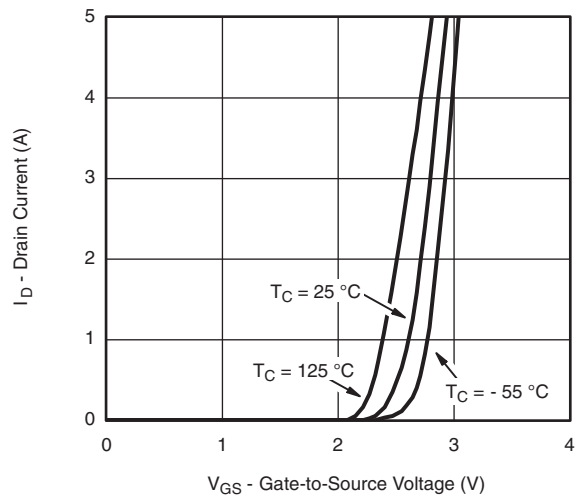
Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production

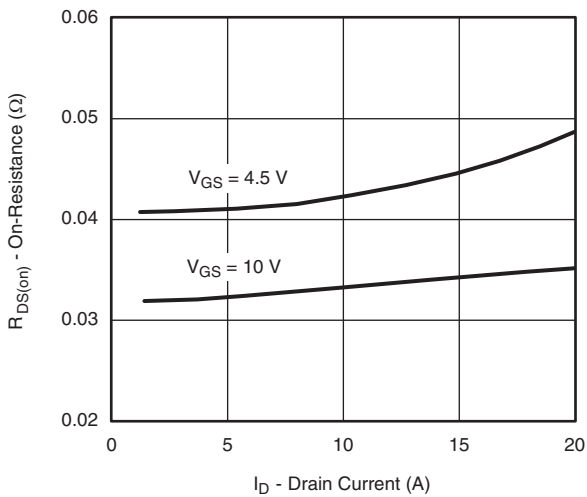
RATING AND CHARACTERISTICS CURVES (RM6A5N30S6)



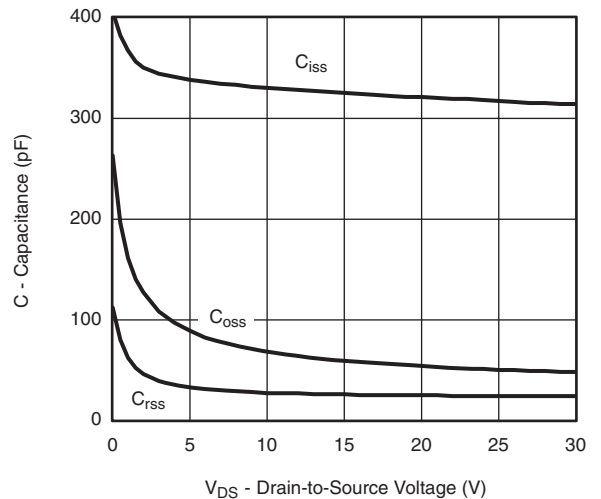
Output Characteristics



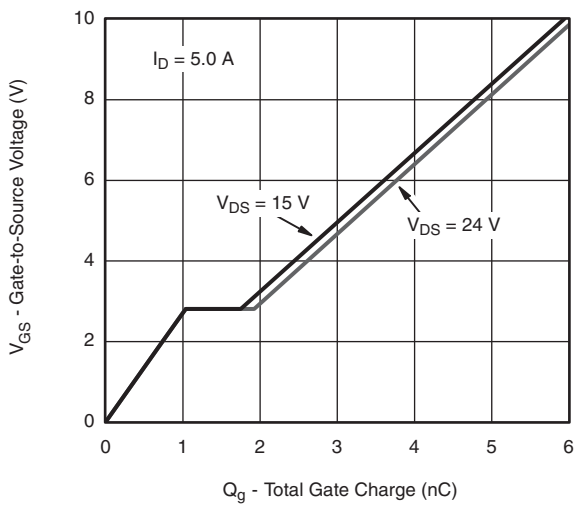
Transfer Characteristics



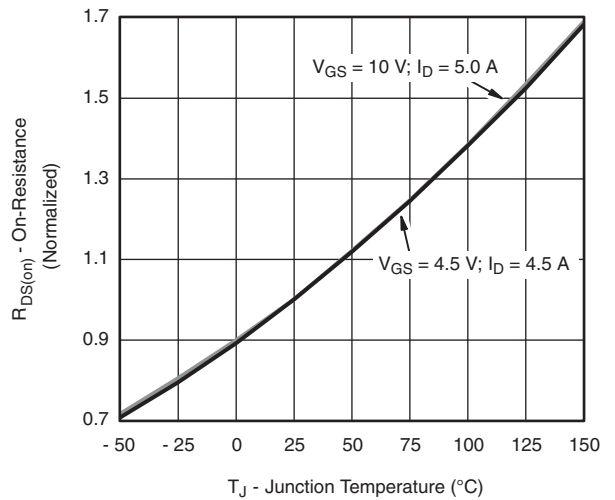
On-Resistance vs. Drain Current



Capacitance

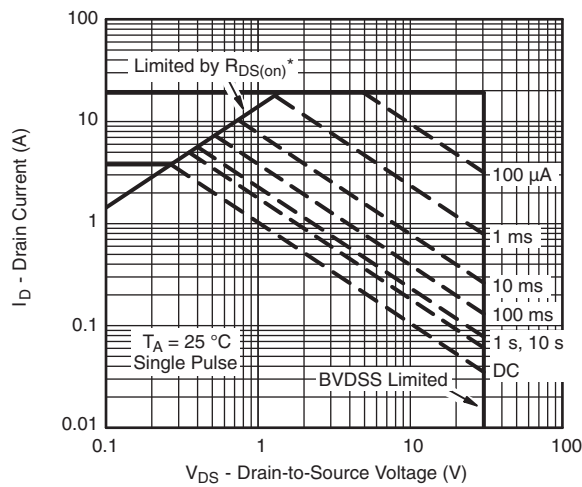
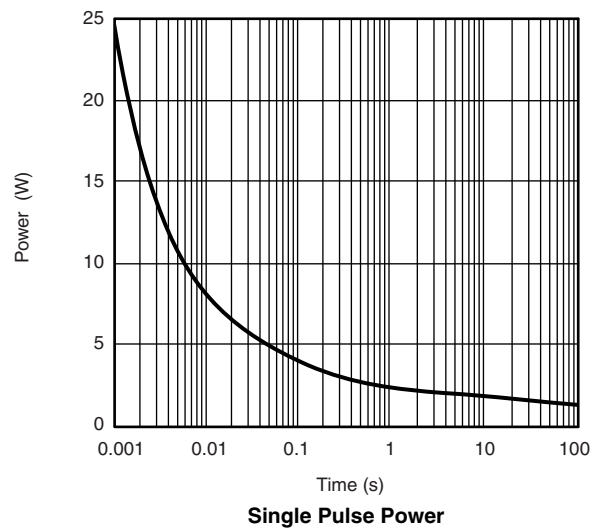
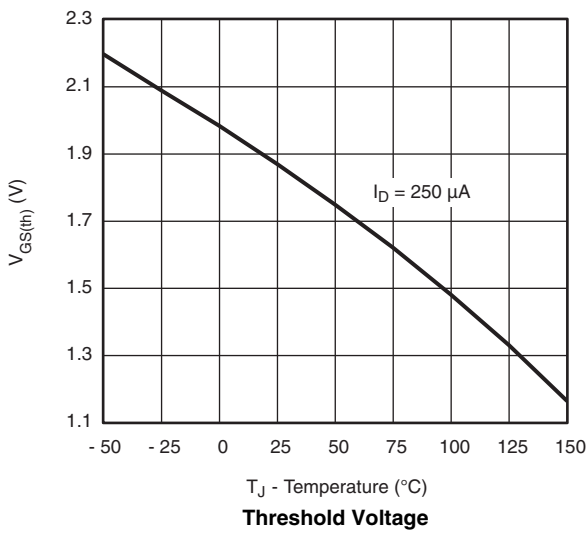
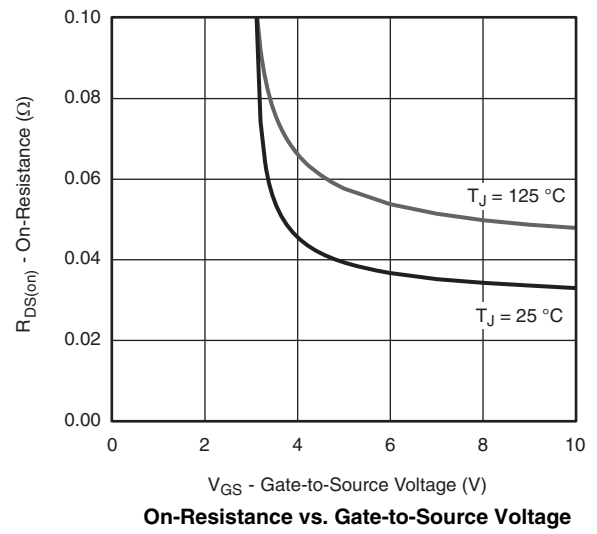
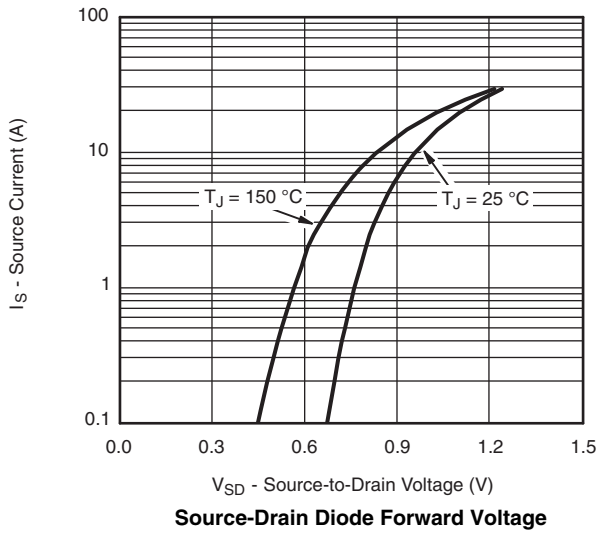


Gate Charge



On-Resistance vs. Junction Temperature

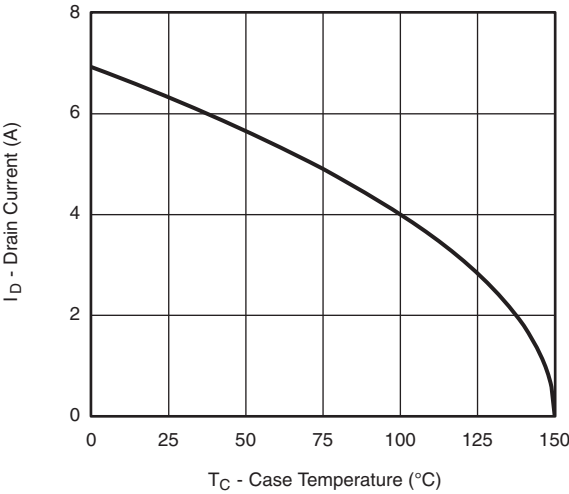
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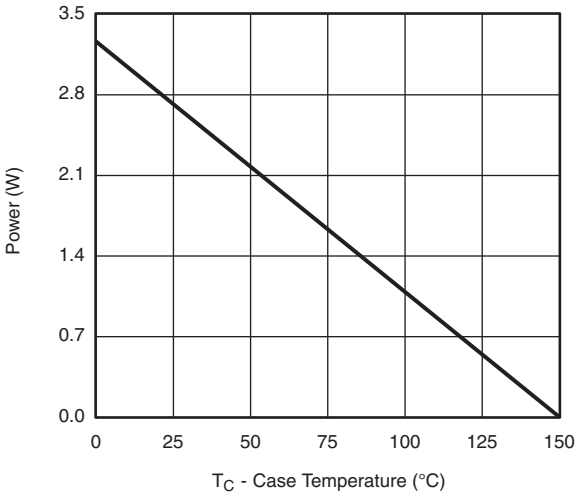
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

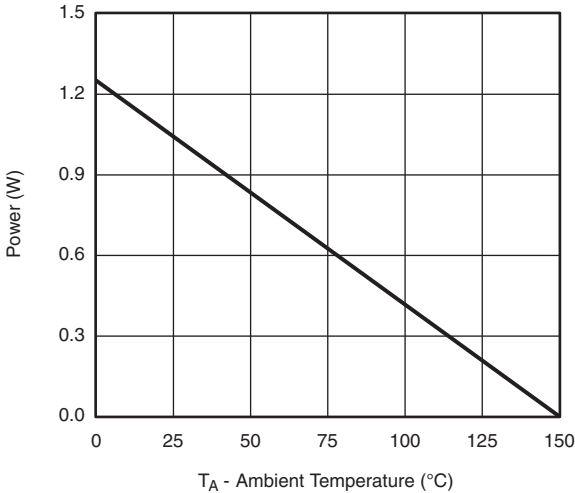
RATING AND CHARACTERISTICS CURVES (RM6A5N30S6)



Current Derating*



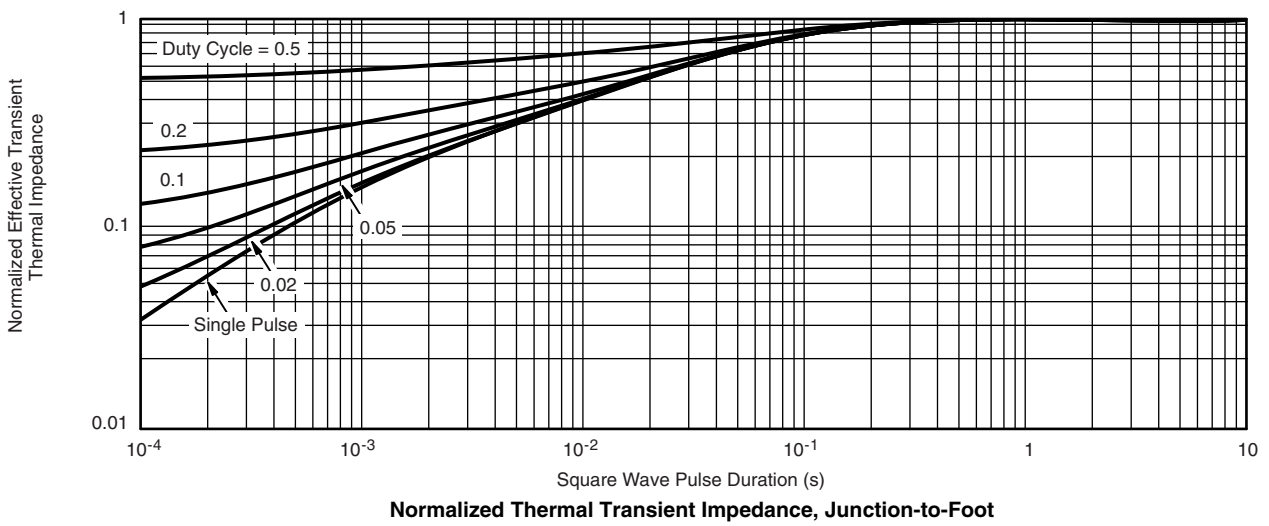
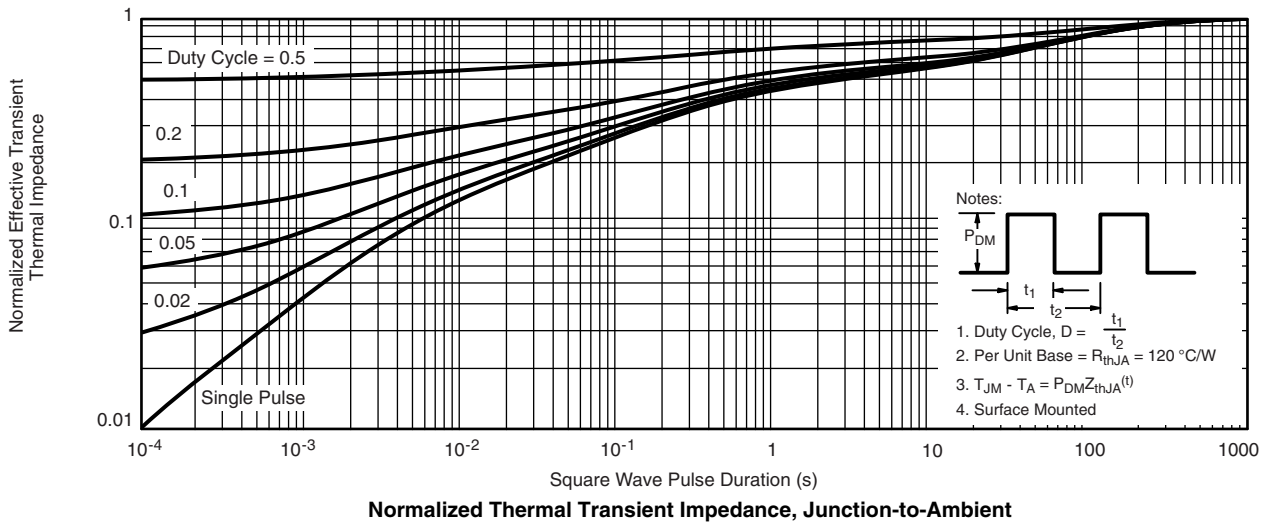
Power Derating (T_C)



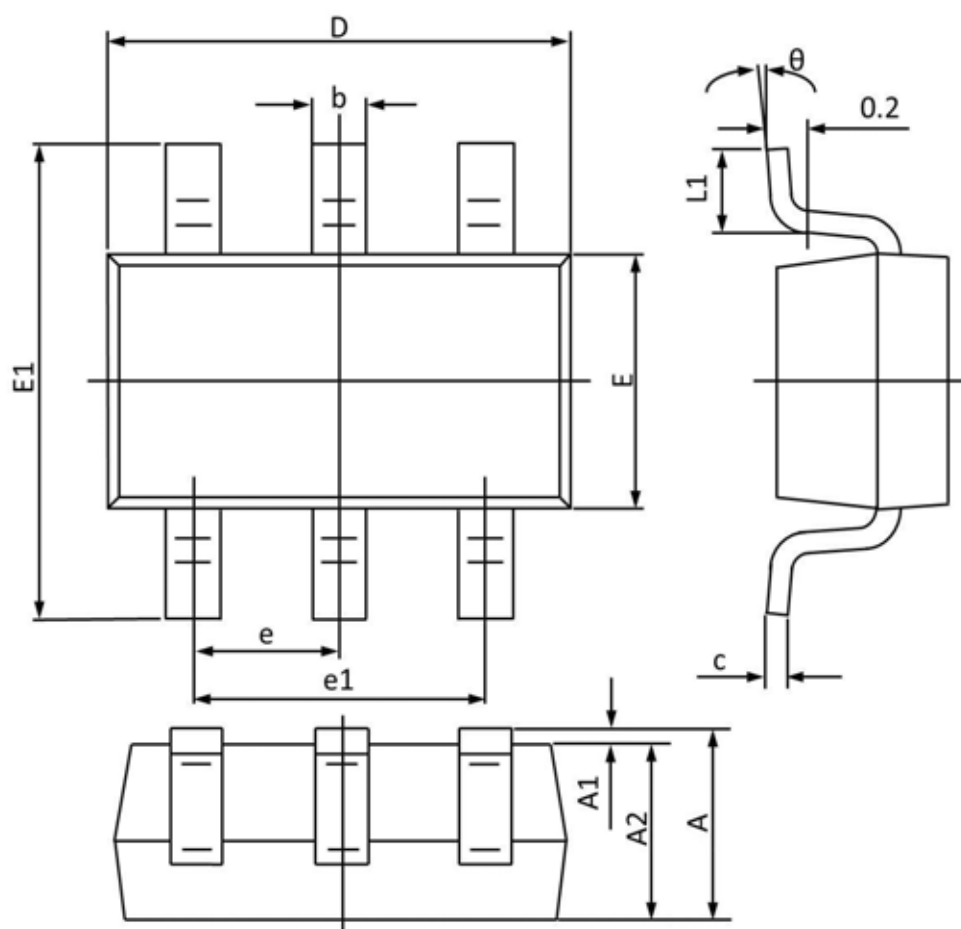
Power Derating (T_A)

* 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.

RATING AND CHARACTERISTICS CURVES (RM6A5N30S6)



SOT23-6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.450	-	0.057	-
A1	0.100	0.000	0.004	0.000
A2	1.300	1.050	0.051	0.041
b	0.500	0.300	0.020	0.012
c	0.200	0.100	0.008	0.004
D	3.100	2.700	0.122	0.106
E	1.800	1.400	0.071	0.055
E1	3.000	2.600	0.118	0.102
e	0.95BSC		0.037BSC	
e1	2.000	1.800	0.079	0.071
L1	0.600	0.300	0.024	0.012
θ	10°	0°	10°	0°

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