

## FEATURES

- |  $V_{DS} = -16V, I_D = -7A$

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- |  $R_{DS(ON)} = 22m\Omega(Typ) @ V_{GS} = -4.5V$

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- |  $R_{DS(ON)} = 35m\Omega(Typ) @ V_{GS} = -2.5V$

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- | ESD Rating : 4000V HBM

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- | High Power and current handing capability

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- | Lead free product is acquired

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- | Surface mount package

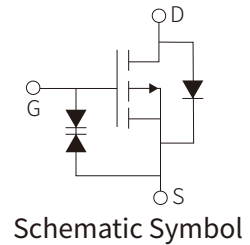


## APPLICATION

- | PWM application

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- | Load switch



## APPROVALS

<b>RoHS</b>	Compliance with 2011/65/EU
<b>HF</b>	Compliance with IEC61249-2-21:2003

## ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	-16	V
Gate Threshold Voltage	$V_{GS}$	$\pm 10$	V
Drain Current - Continuous	$I_D$	-7	A
Drain Current Pulsed (Note1)	$I_{DM}$	-24.8	A
Maximum Power Dissipation	$P_D$	1.5	W
Thermal Resistance Junction- to- Ambient <sup>(Note2)</sup>	$R_{\theta JA}$	88.7	$^{\circ}C/W$
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	$^{\circ}C$

## ELECTRICAL CHARACTERISTICS (Ta=25°C )

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-16			V
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-16V, V_{GS}=0V$			1	$\mu A$
<b>On Characteristics<sup>(Note 3)</sup></b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-0.45	-0.65	-1.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4A$		22	30	m $\Omega$
		$V_{GS}=-2.5V, I_D=-4A$		35	48	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4A$		21		S
<b>Dynamic Characteristics<sup>(Note 4)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, f=1MHz$		580		pF
Output Capacitance	$C_{oss}$			184		pF
Reverse Transfer Capacitance	$C_{rss}$			106		pF
<b>Switching Characteristics<sup>(Note 4)</sup></b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-10V, R_L=2.5\Omega$ $V_{GS}=-4.5V, R_{GEN}=3\Omega$		9.8		ns
Turn-on Rise Time	$t_r$			17		ns
Turn-Off Delay Time	$t_{d(off)}$			94		ns
Turn-off Fall Time	$t_f$			35		ns
Total Gate Charge	$Q_{gs}$	$V_{DS}=-10V, I_D=-4A$ $V_{GS}=-4.5V$		17.2		nC
Gate-Source Charge	$Q_{gs}$			1.3		nC
Gate-Drain Charge	$Q_{gd}$			4.5		nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage <sup>(Note 3)</sup>	$V_{DS}$	$V_{GS}=0V, I_S=-1A$		-0.79	-1	V
Diode Forward Current <sup>(Note 2)</sup>	$I_S$				-2.2	A

**Notes:**

1. Repetitive rating : Pulse width limited by junction temperature
2. Surface Mounted on FR4 Board  $t \leq 10sec$ .
3. Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Guaranteed design, not subject to production testing.

# PARAMETER CHARACTERISTIC CURVE

Figure1: Switching Test Circuit

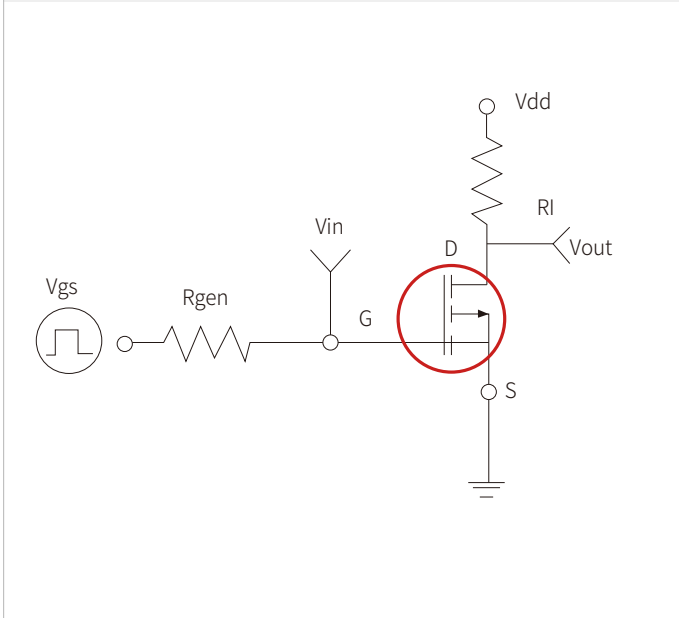


Figure2: Switching Waveforms

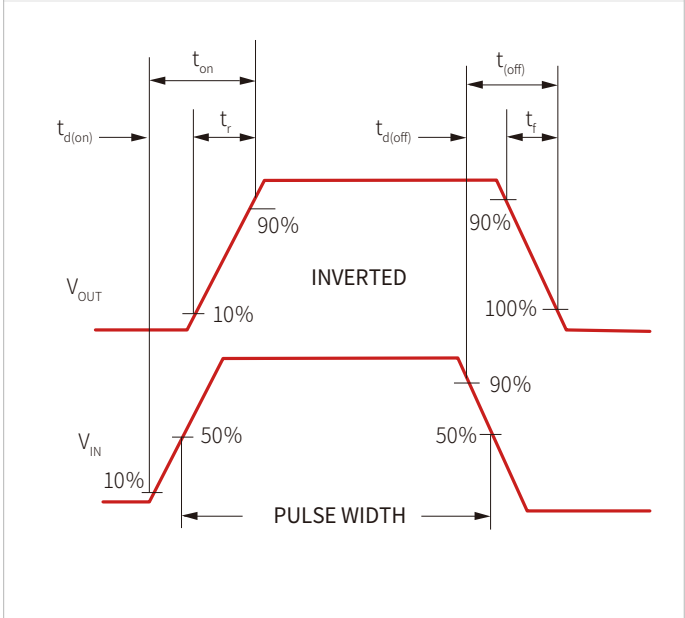


Figure3: Power Dissipation

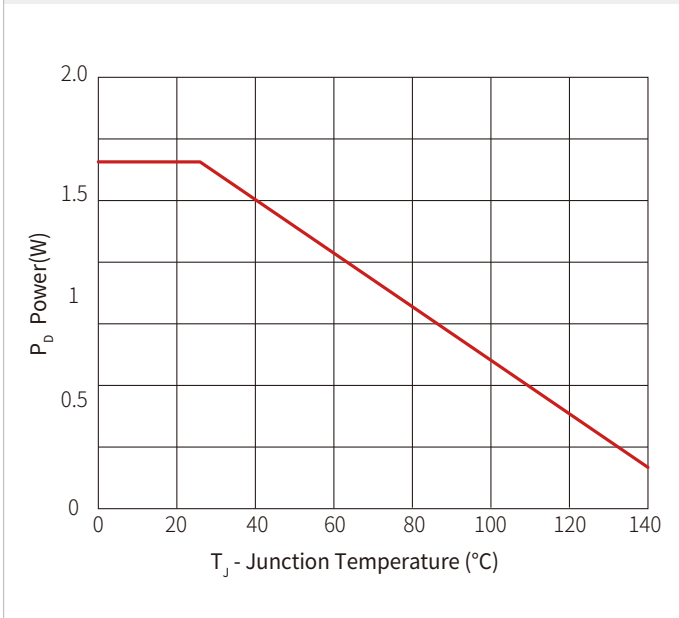
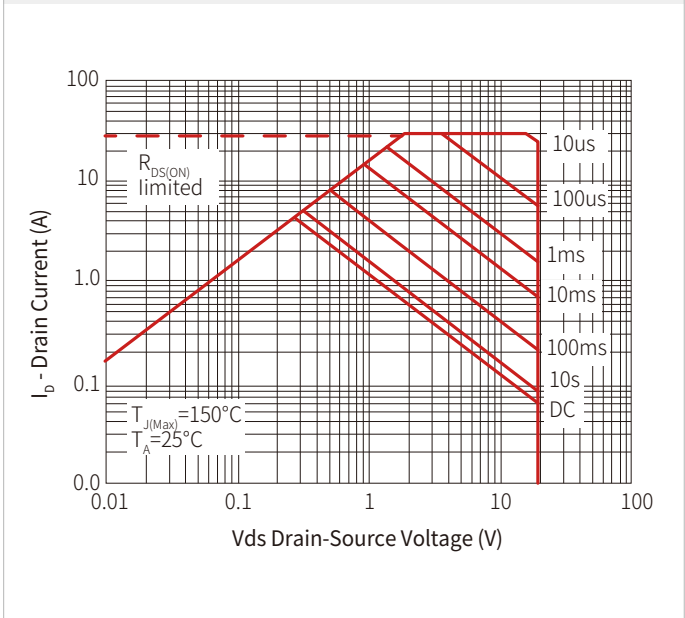
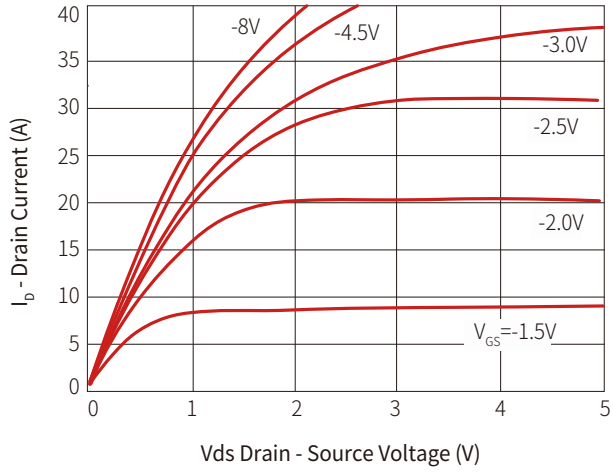


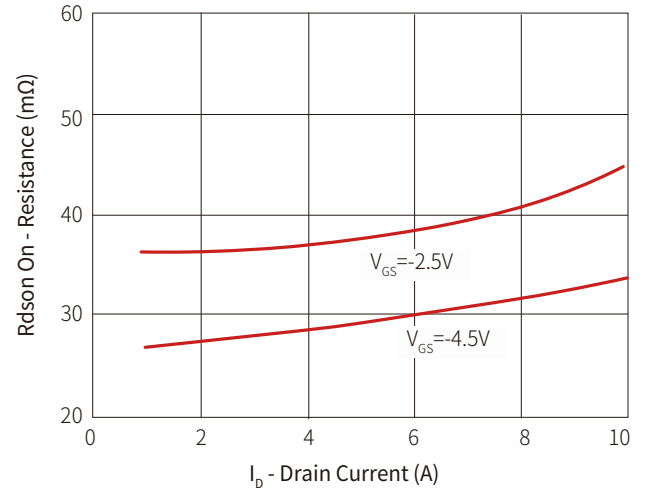
Figure 4: Safe Operation Area



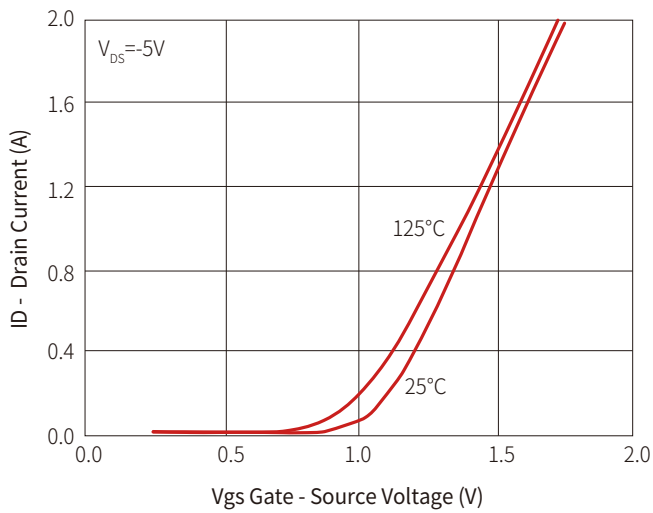
**Figure 5: Output Characteristics**



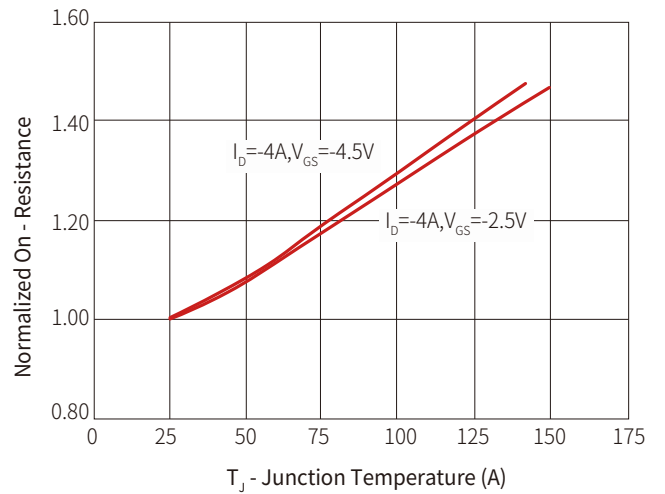
**Figure 6: Drain-Source On-Resistance**



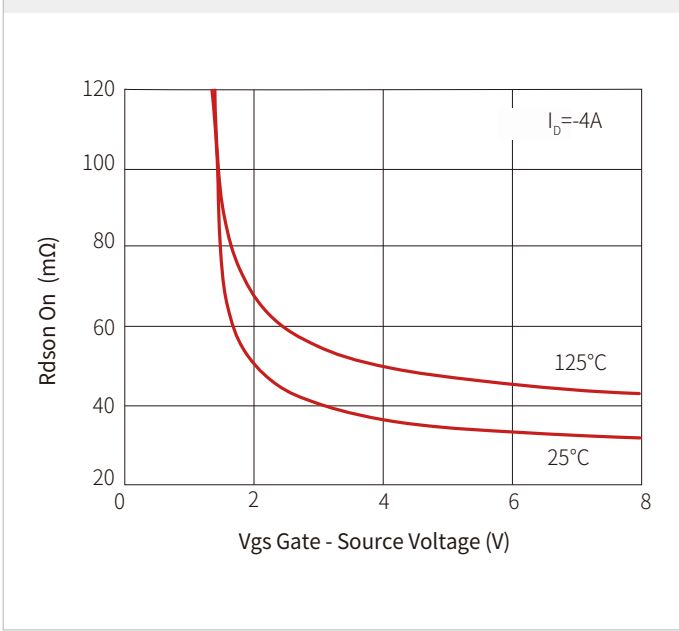
**Figure 7: Transfer Characteristics**



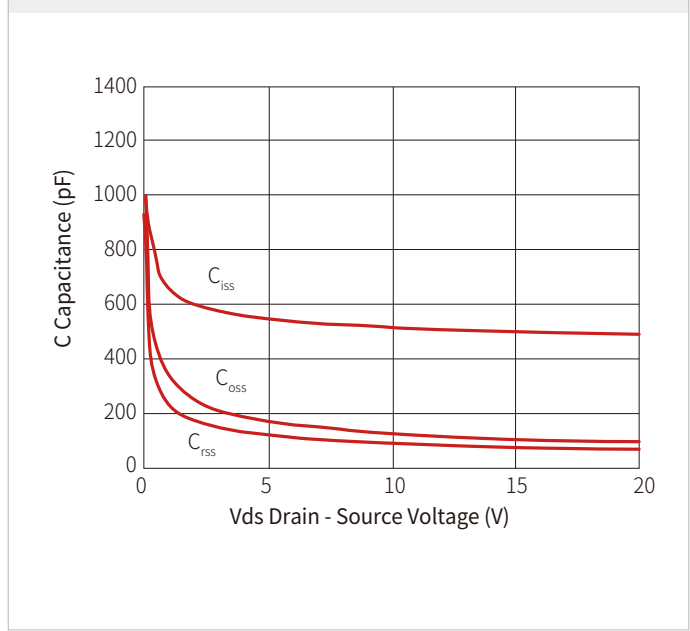
**Figure 8: Drain-Source On-Resistance**



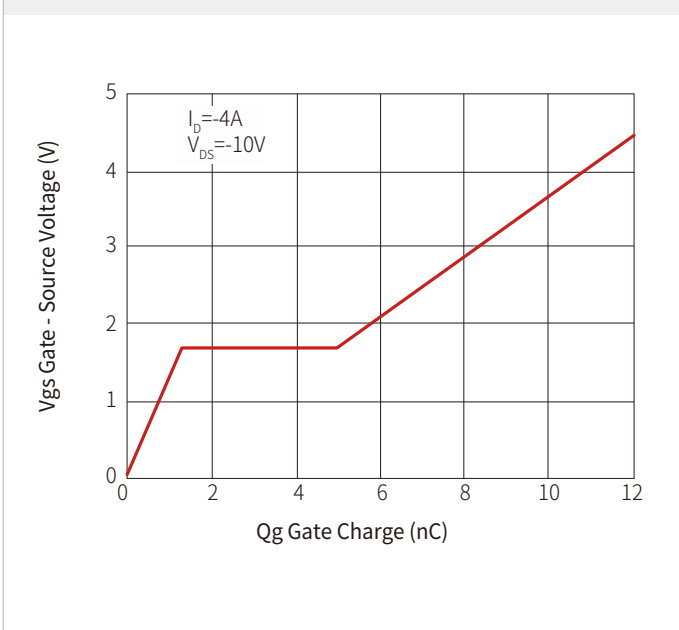
**Figure 9: R<sub>ds(on)</sub> vs V<sub>gs</sub>**



**Figure 10: Capacitance vs V<sub>ds</sub>**



**Figure 11: Gate Charge**



**Figure 12: Source-Drain Diode Forward**

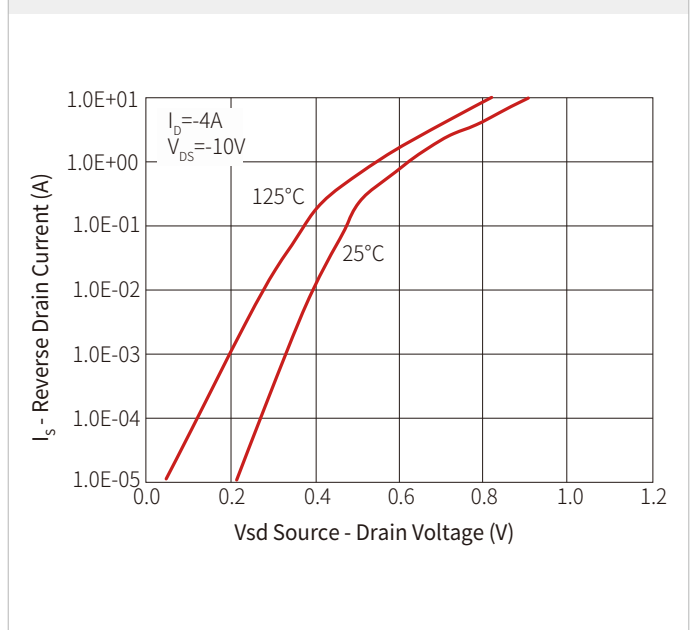
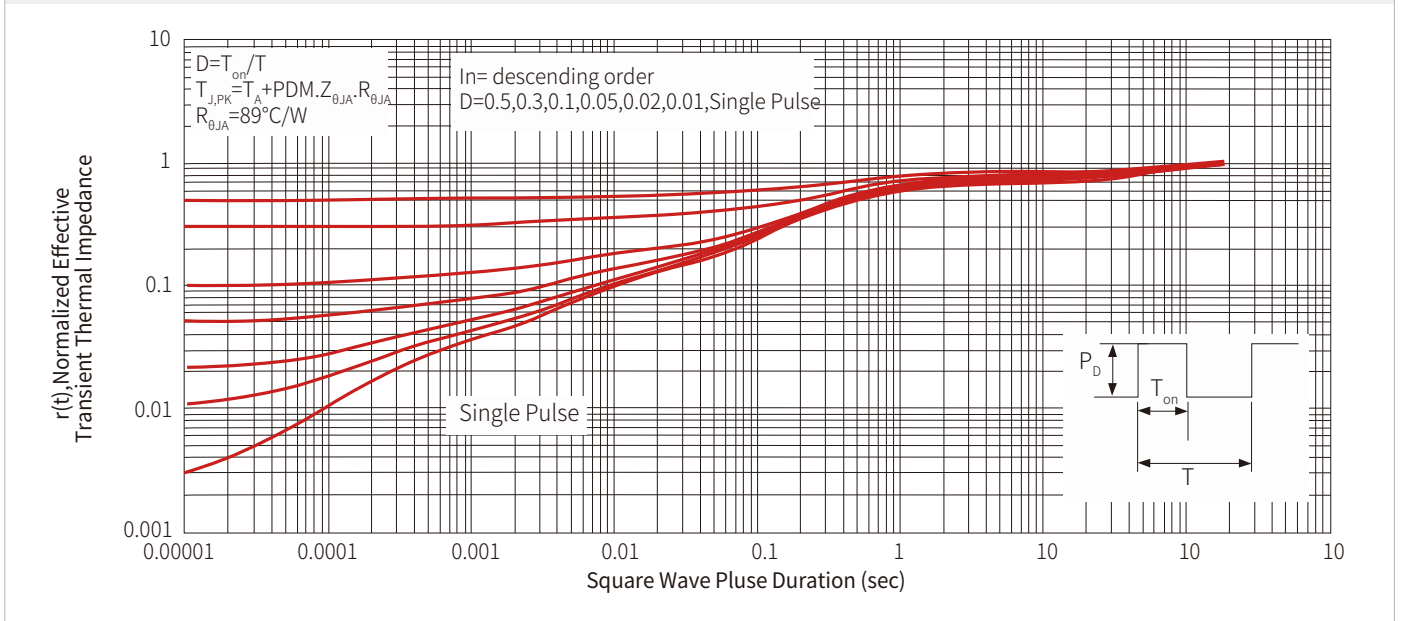
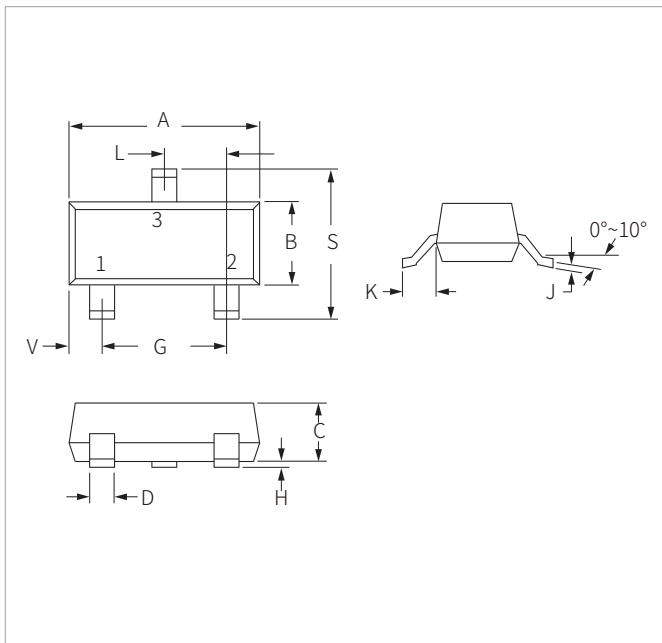


Figure 13: Normalized Maximim Transient Thermal Impedance

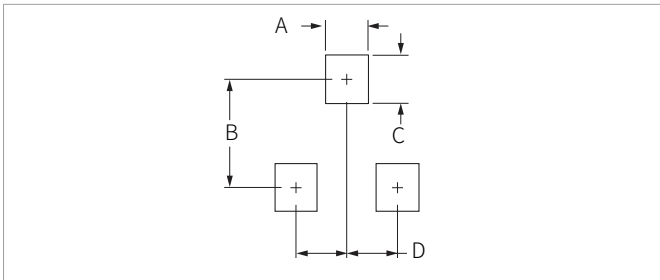


## SOT-23 PACKAGE INFORMATION



Ref.	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.80	3.05	0.110	0.120
B	1.20	1.40	0.047	0.055
C	0.90	1.15	0.035	0.045
D	0.37	0.50	0.015	0.020
G	1.75	2.05	0.069	0.081
H	0.01	0.100	0.001	0.004
J	0.085	0.180	0.003	0.007
K	0.35	0.69	0.014	0.029
L	0.89	1.02	0.035	0.040
S	2.10	2.65	0.083	0.104
V	0.45	0.60	0.018	0.024

## RECOMMENDED PAD LAYOUT DIMENSIONS



Ref.	Millimeters		Inches	
	Min	Max	Min	Max
A	0.71	0.97	0.028	0.038
B	1.88	2.13	0.074	0.084
C	0.71	0.97	0.028	0.038
D	0.81	1.07	0.032	0.042

## ORDERING INFORMATION

Part Number	Component Package	QTY/Reel	Reel Size
SPM3415S	SOT-23	3000PCS	7"

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