

NCE P-Channel Enhancement Mode Power MOSFET

Description

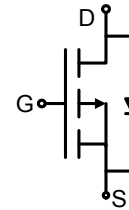
The NCE3407 uses advanced trench technology to provide excellent $R_{DS(ON)}$. This device is suitable for use as a load switch or in PWM applications.

General Features

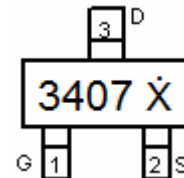
- $V_{DS} = -30V, I_D = -4.6A$
 $R_{DS(ON)} < 95m\Omega @ V_{GS} = -4.5V$
 $R_{DS(ON)} < 65m\Omega @ V_{GS} = -10V$
- High power and current handling capability
- Lead free product is acquired
- Surface mount package

Application

- PWM applications
- Load switch
- Power management



Schematic diagram



Marking and pin assignment



SOT-23 top view

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
3407 X	NCE3407	SOT-23	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}	-30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	-4.6	A
Drain Current-Pulsed ^(Note 1)	I_{DM}	-20	A
Maximum Power Dissipation	P_D	1.4	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)	$R_{\theta JA}$	90	$^\circ C/W$
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Electrical Characteristics ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS} = 0V, I_D = -250\mu A$	-30	-33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -24V, V_{GS} = 0V$	-	-	-1	μA

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics <small>(Note 3)</small>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.1	-1.5	-2.2	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4.6A$	-	48	65	m Ω
		$V_{GS}=-4.5V, I_D=-4A$	-	60	95	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-4.6A$	-	10	-	S
Dynamic Characteristics <small>(Note 4)</small>						
Input Capacitance	C_{ISS}	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0MHz$	-	650	-	PF
Output Capacitance	C_{OSS}		-	105	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	65	-	PF
Switching Characteristics <small>(Note 4)</small>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, R_L=3.6\Omega$ $V_{GS}=-10V, R_{GEN}=3\Omega$	-	8.5	-	nS
Turn-on Rise Time	t_r		-	4.5	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	t_f		-	12.5	-	nS
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-4.6A, V_{GS}=-10V$	-	12.5	-	nC
Gate-Source Charge	Q_{gs}		-	2.8	-	nC
Gate-Drain Charge	Q_{gd}		-	2.7	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage <small>(Note 3)</small>	V_{SD}	$V_{GS}=0V, I_S=-4.6A$	-	-	-1.2	V

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

Typical Electrical and Thermal Characteristics



Figure 1: Switching Test Circuit



Figure 2: Switching Waveforms

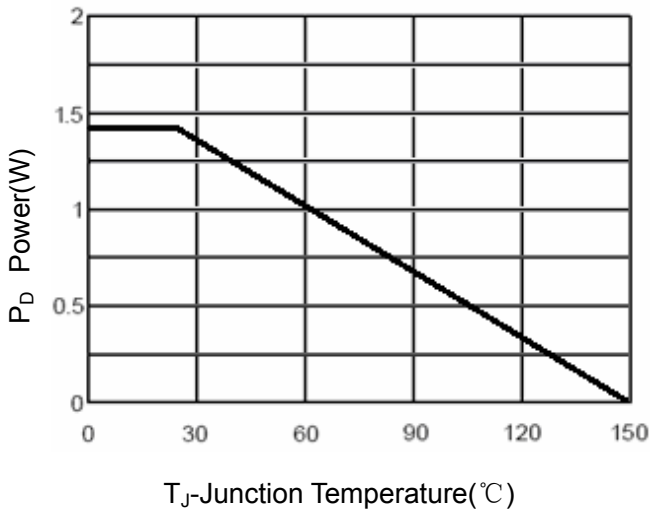


Figure 3 Power Dissipation

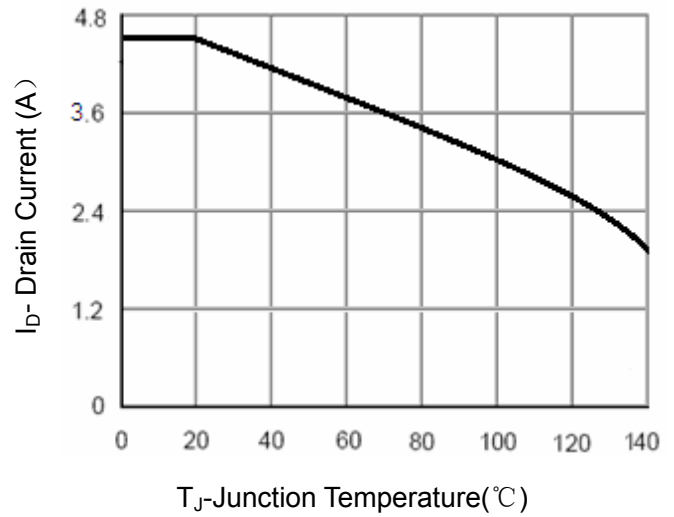


Figure 4 Drain Current

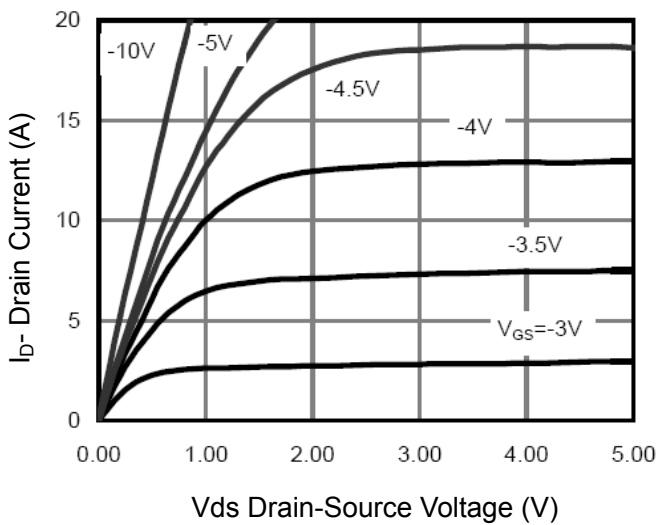


Figure 5 Output Characteristics

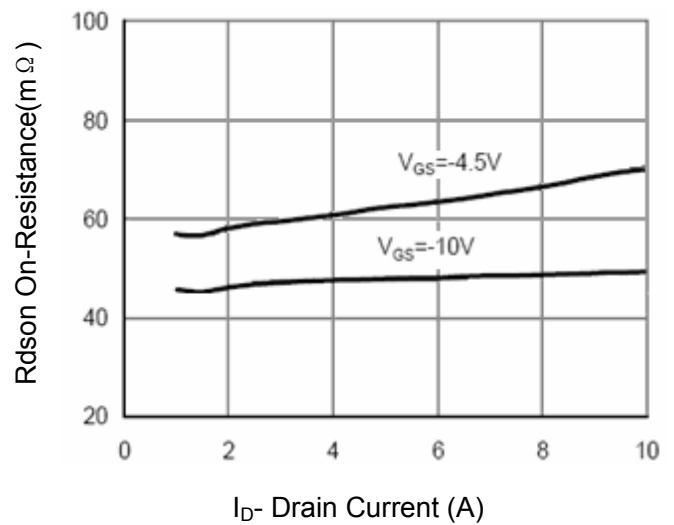
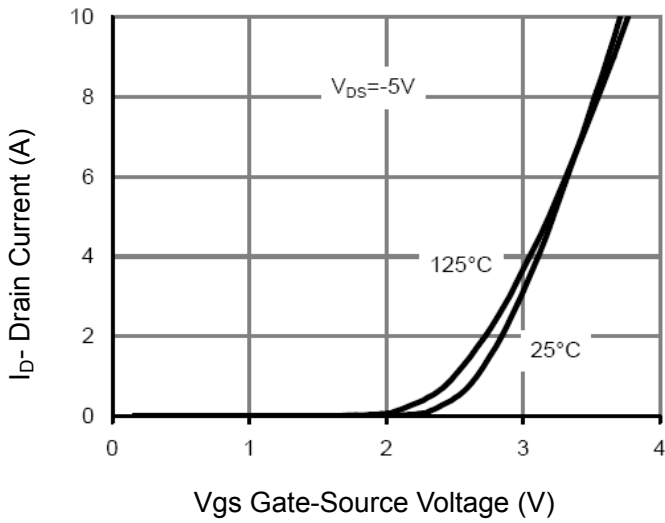
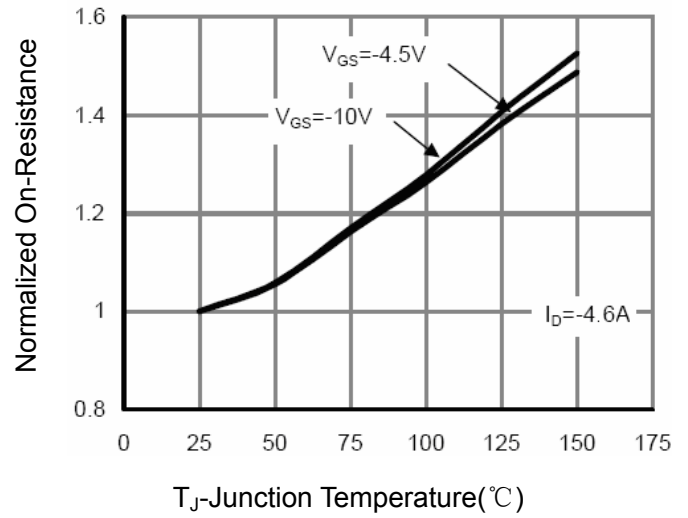


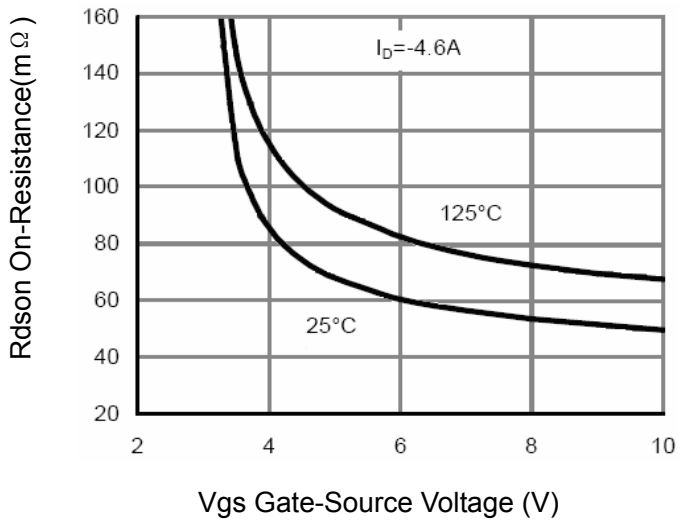
Figure 6 Drain-Source On-Resistance



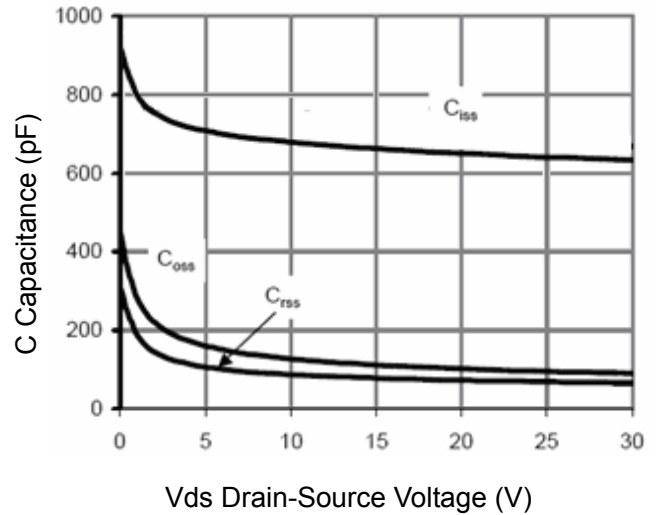
V_{GS} Gate-Source Voltage (V)
Figure 7 Transfer Characteristics



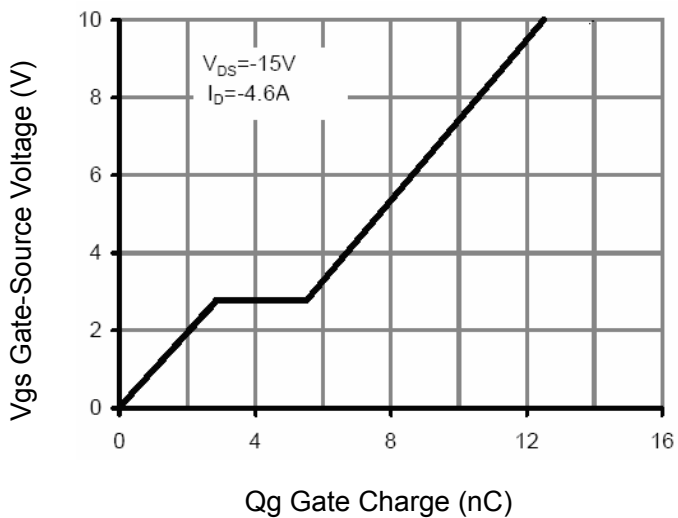
T_J-Junction Temperature(°C)
Figure 8 Drain-Source On-Resistance



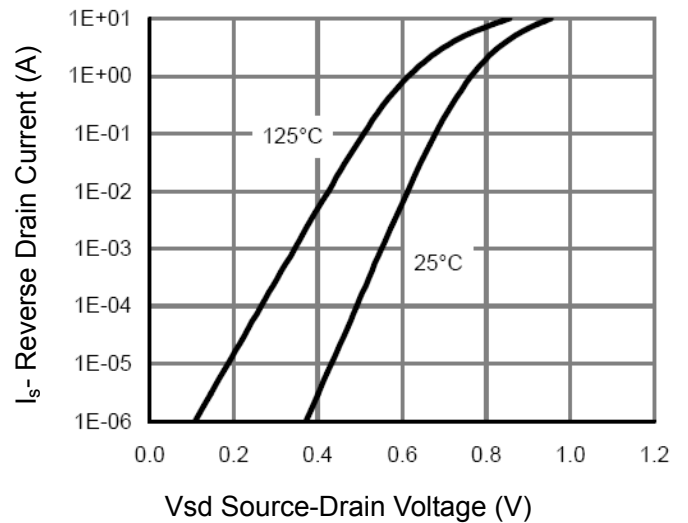
V_{GS} Gate-Source Voltage (V)
Figure 9 Rdson vs Vgs



V_{DS} Drain-Source Voltage (V)
Figure 10 Capacitance vs Vds



Q_g Gate Charge (nC)
Figure 11 Gate Charge



V_{SD} Source-Drain Voltage (V)
Figure 12 Source- Drain Diode Forward

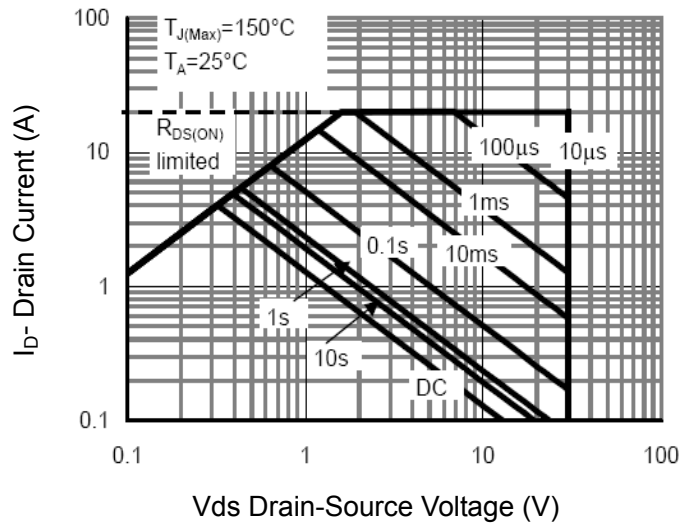


Figure 13 Safe Operation Area

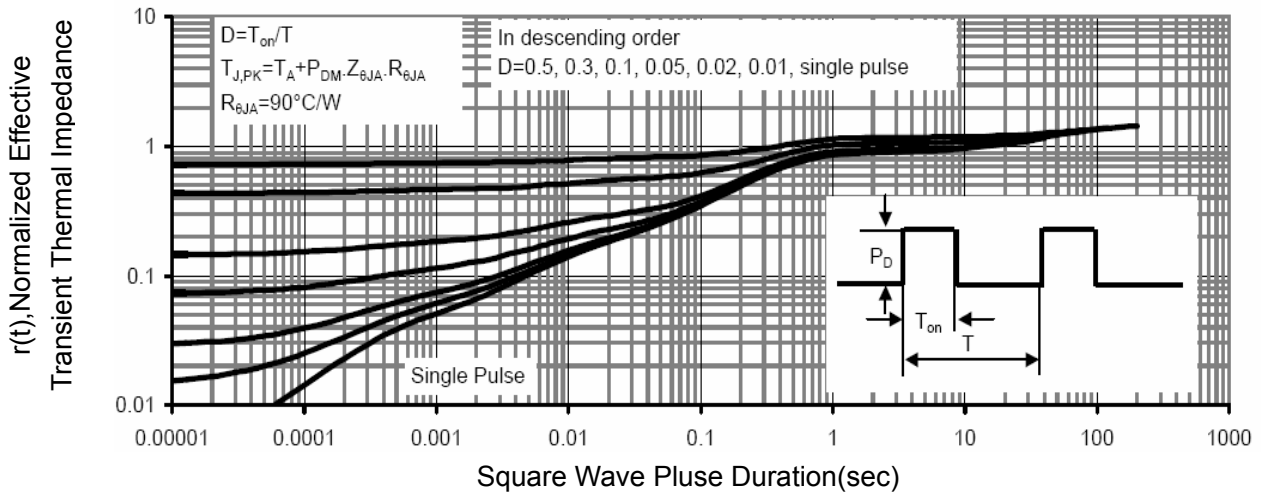
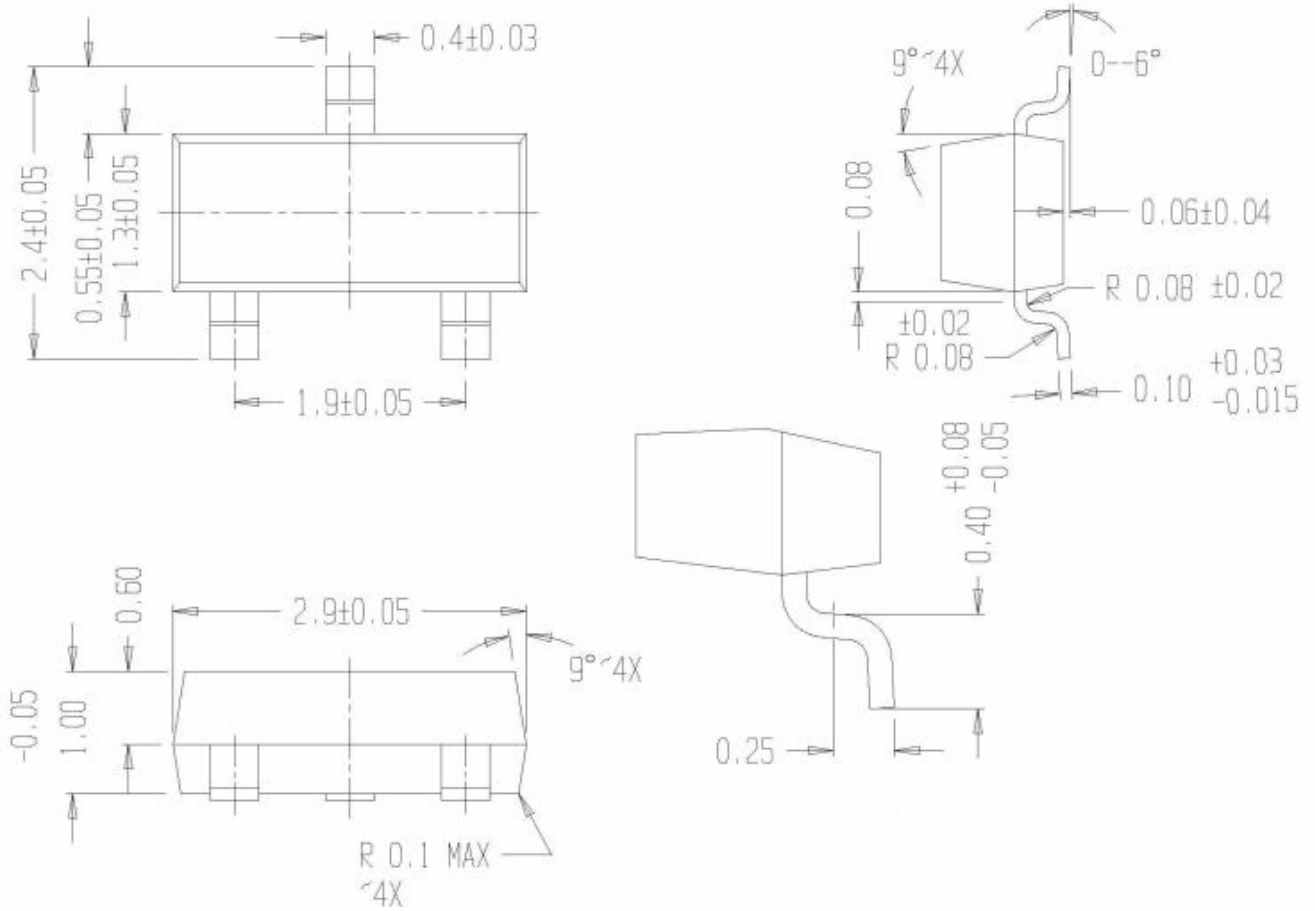
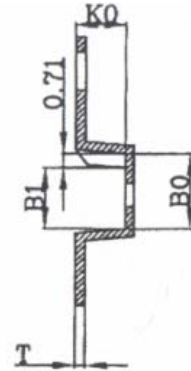
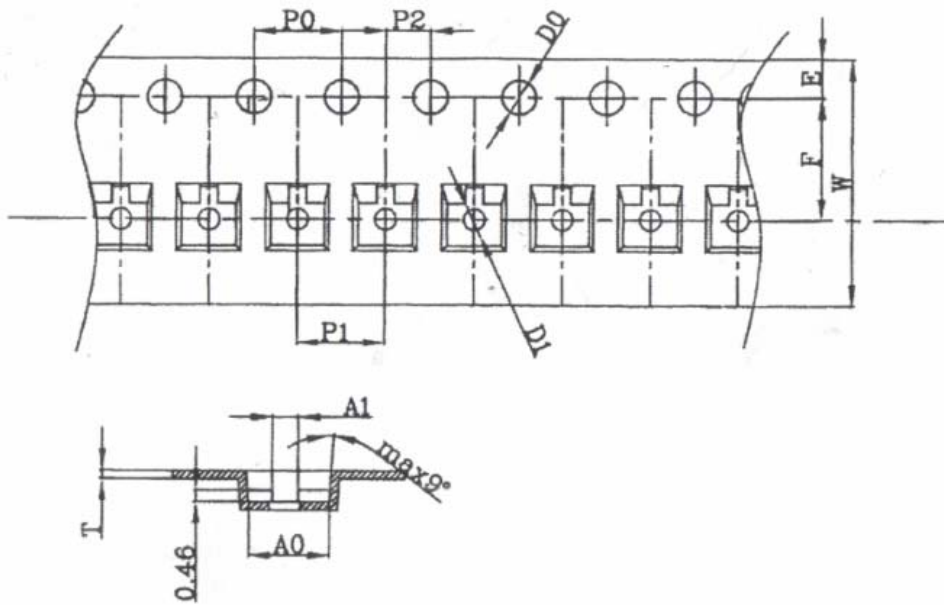


Figure 14 Normalized Maximum Transient Thermal Impedance

SOT-23 Package Information





NOTE:
 1. 材料: 导电PC (Denka ECM3K, 0.20T);
 2. 10个链孔的累积公差不能超过0.2mm;
 3. 250mm带子的扇形不得超过1mm;
 4. 所有尺寸符合EIA-481-E的要求

SYMBOL	A0	A1	B0	B1	K0	P0	P1	P2
SPEC	3.15±0.10	0.99±0.2	2.77±0.10	2.06±0.10	1.22±0.10	4.00±0.10	4.00±0.10	2.00±0.05
SYMBOL	T	E	F	D0	D1	W		
SPEC	0.2±0.02	1.75±0.10	3.50±0.50	1.55 ^{+0.1} ₀	1.0 ^{+0.25} ₀	8.00±0.1		

Carrier Tape

PKG TYPE	Lead count	Tape Width	Reel Diameter	QTY/Reel	QTY/Outer Box	G.W.(kg)
SOT-23	3	8mm	7"	3000	180000	6.5

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