

**30V N-Channel Enhancement Mode MOSFET**

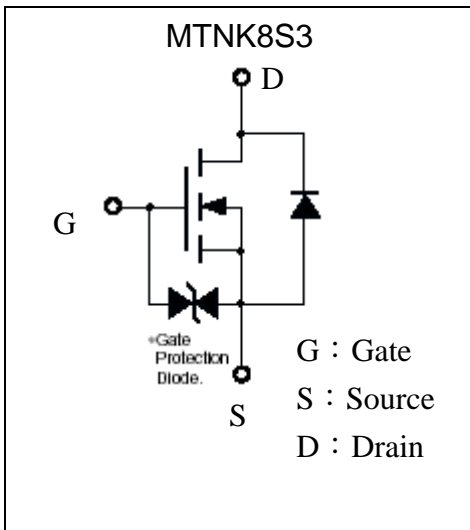
# MTNK8S3

$BV_{DSS}$	30V
$I_D @ V_{GS}=10V, T_A=25^\circ C$	0.45A
$R_{DS(on)(MAX)} @ V_{GS}=10V, I_D=0.5A$	0.39 $\Omega$ (typ.)
$R_{DS(on)(MAX)} @ V_{GS}=4.5V, I_D=0.2A$	0.45 $\Omega$ (typ.)
$R_{DS(on)(MAX)} @ V_{GS}=3V, I_D=0.1A$	0.65 $\Omega$ (typ.)

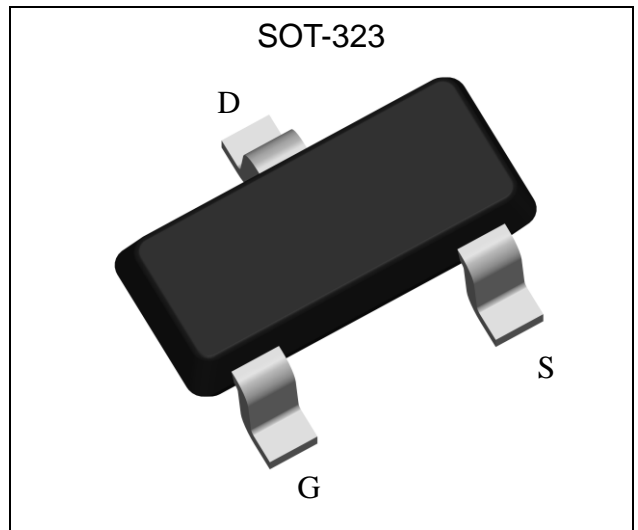
**Features**

- Simple drive requirement
- Small package outline
- ESD protected gate,  $\geq 2kV$  (HBM)
- Pb-free lead plating and halogen-free package

**Symbol**

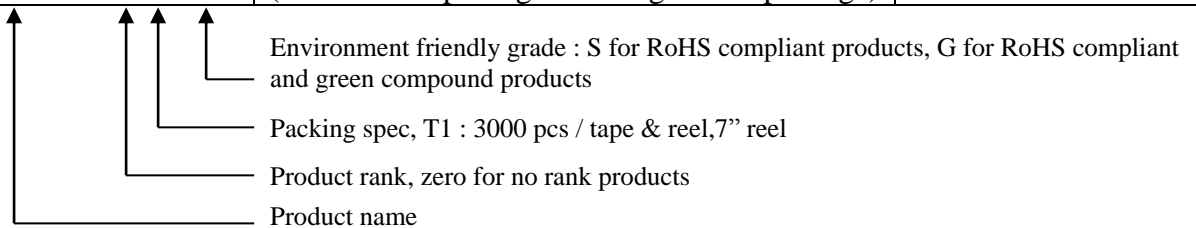


**Outline**



**Ordering Information**

Device	Package	Shipping
MTNK8S3-0-T1-G	SOT-323 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel





**Absolute Maximum Ratings** (Ta=25°C)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =25°C (Note 3)	I <sub>D</sub>	0.45	A
Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =70°C (Note 3)		0.36	
Pulsed Drain Current (Notes 1, 2)	I <sub>DM</sub>	1.8	
ESD susceptibility (Note 4)	V <sub>ESD</sub>	2000	V
Maximum Power Dissipation@ T <sub>A</sub> =25°C (Note 3)	P <sub>D</sub>	0.2	W
Operating Junction and Storage Temperature	T <sub>j</sub> , T <sub>stg</sub>	-55~+150	°C

**Thermal Performance**

Parameter	Symbol	Limit	Unit
Thermal Resistance, Junction-to-Ambient, max (Note 3)	R <sub>θJA</sub>	625	°C/W
Thermal Resistance, Junction-to-Case, max	R <sub>θJC</sub>	250	

- Note : 1. Pulse width limited by maximum junction temperature.  
 2. Pulse width ≤ 300μs, duty cycle ≤ 2%.  
 3. Surface mounted on copper pad of FR-4 board with minimum footprint, 2 oz. copper.  
 4. Human body model, 1.5kΩ in series with 100pF

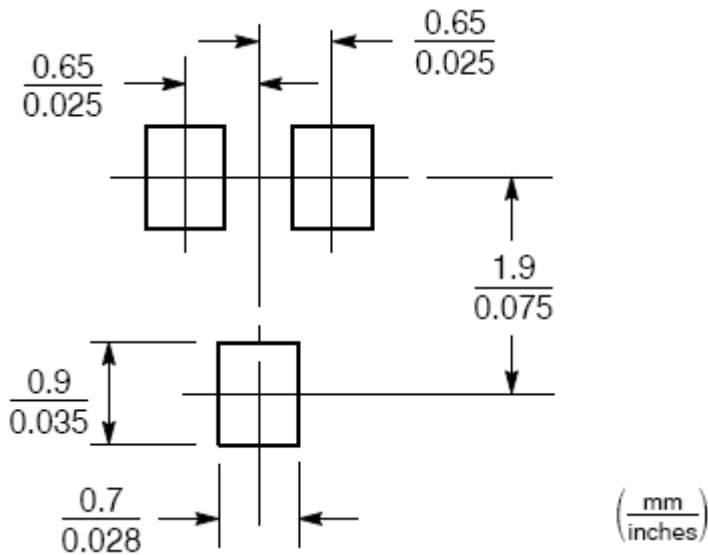
**Electrical Characteristics (Tj=25°C, unless otherwise noted)**

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
<b>Static</b>					
BV <sub>DSS</sub>	30	-	-	V	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA
ΔBV <sub>DSS</sub> /ΔT <sub>j</sub>	-	0.03	-	V/°C	Reference to 25°C, I <sub>D</sub> =250μA
V <sub>GS(th)</sub>	0.7	-	1.6	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA
I <sub>GSS</sub>	-	-	±10	μA	V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V
I <sub>DSS</sub>	-	-	1		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V
	-	-	10		V <sub>DS</sub> =24V, V <sub>GS</sub> =0V (T <sub>j</sub> =70°C)
*R <sub>Ds(ON)</sub>	-	0.39	0.8	Ω	I <sub>D</sub> =0.5A, V <sub>GS</sub> =10V
	-	0.45	1		I <sub>D</sub> =0.2A, V <sub>GS</sub> =4.5V
	-	0.65	3		I <sub>D</sub> =0.1A, V <sub>GS</sub> =3V
*G <sub>FS</sub>	-	0.34	-	S	V <sub>DS</sub> =10V, I <sub>D</sub> =0.1A
<b>Dynamic</b>					
C <sub>iss</sub>	-	23	-	pF	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz
C <sub>oss</sub>	-	11	-		
C <sub>rss</sub>	-	3	-		

$t_{d(ON)}$	-	2.8	-	ns	$V_{DS}=15V, I_D=0.5A, V_{GS}=10V, R_G=1\Omega$
$t_r$	-	15.4	-		
$t_{d(OFF)}$	-	9.8	-		
$t_f$	-	6.6	-		
$Q_g$	-	1.7	-	nC	$V_{DS}=15V, I_D=0.5A, V_{GS}=10V$
$Q_{gs}$	-	0.7	-		
$Q_{gd}$	-	0.5	-		
<b>Source-Drain Diode</b>					
$I_S$	-	-	0.45	A	
$I_{SM}$	-	-	1.8		
$*V_{SD}$	-	0.84	1.2	V	$V_{GS}=0V, I_S=0.3A$
$*t_{rr}$	-	5	-	ns	$I_F=0.5A, dI_F/dt=100A/\mu s$
$*Q_{rr}$	-	1.2	-	nC	

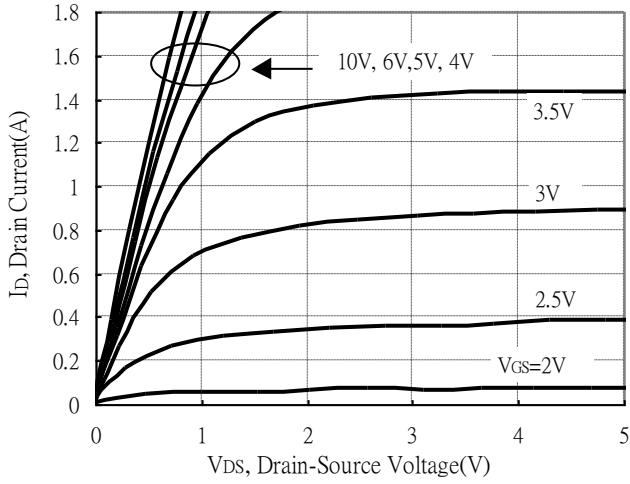
\*Pulse Test : Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$

### Recommended Soldering Footprint

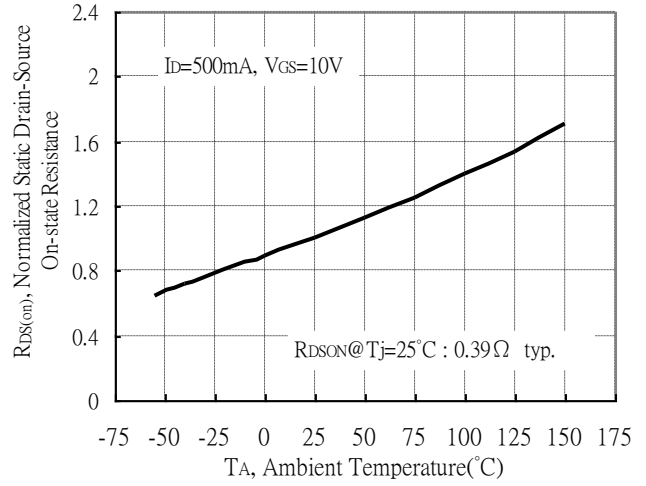


## Typical Characteristics

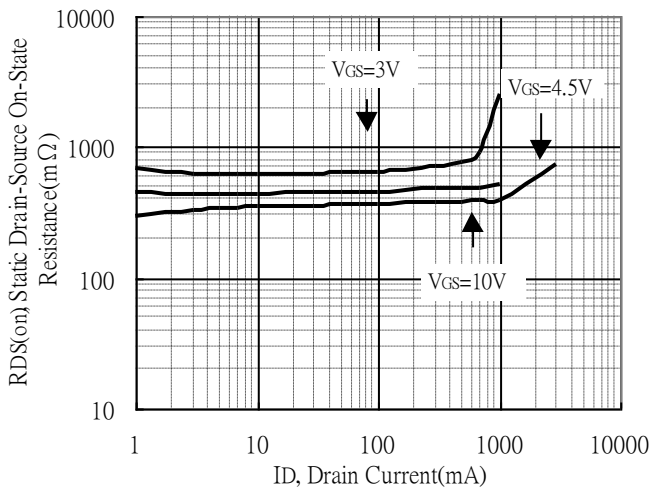
Typical Output Characteristics



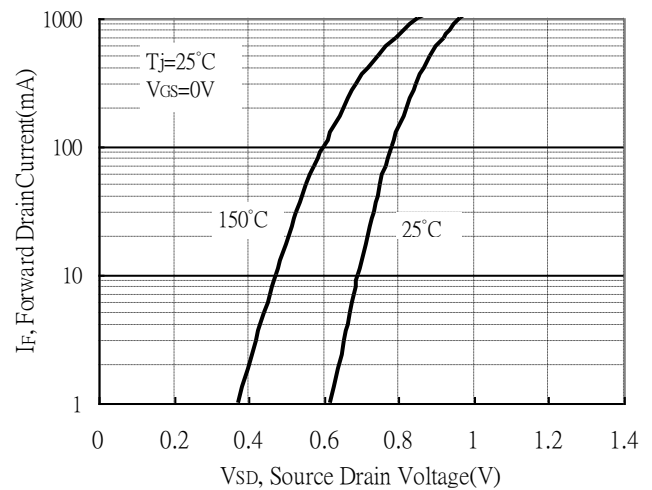
Static Drain-Source On-resistance vs Ambient Temperature



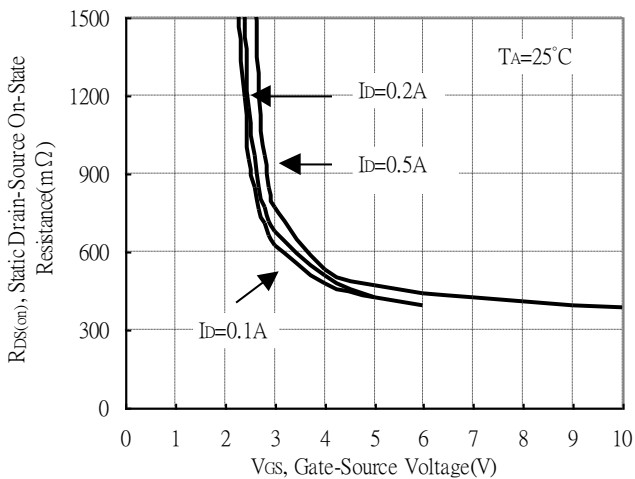
Static Drain-Source On-State resistance vs Drain Current



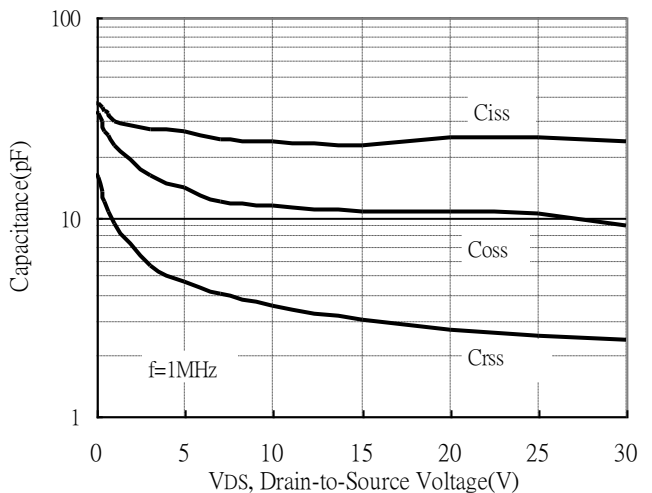
Forward Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

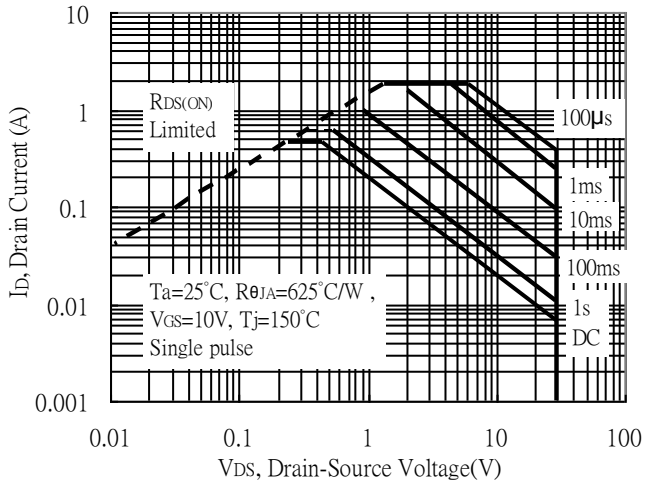


Capacitance vs Reverse Voltage

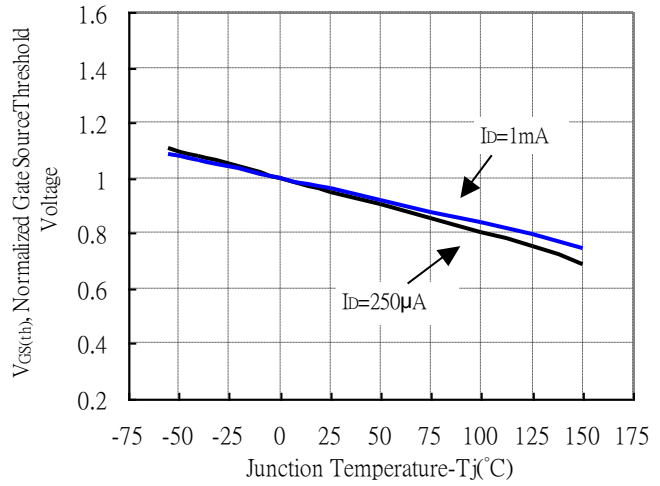


**Typical Characteristics(Cont.)**

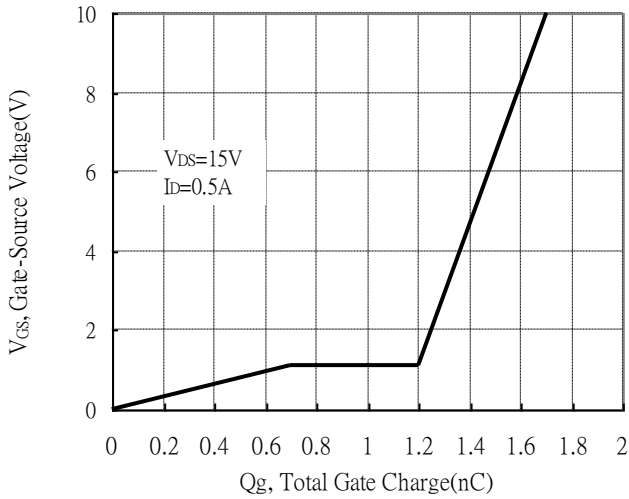
Maximum Safe Operating Area



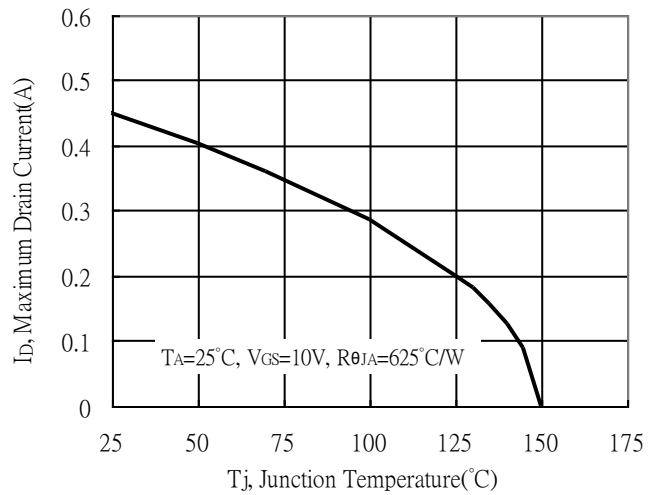
Gate Threshold Voltage vs Ambient Temperature



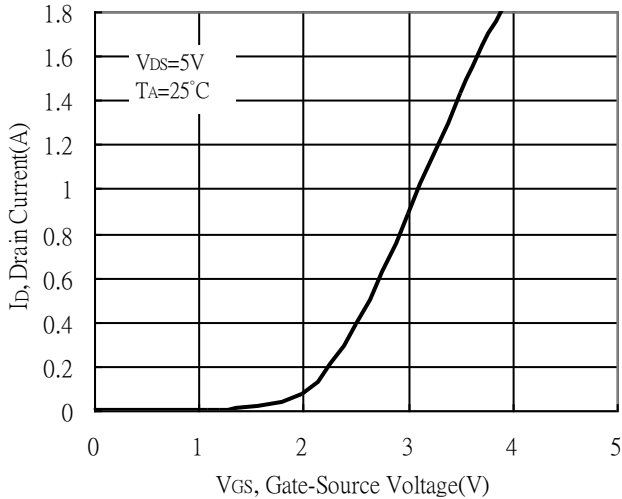
Gate Charge Characteristics



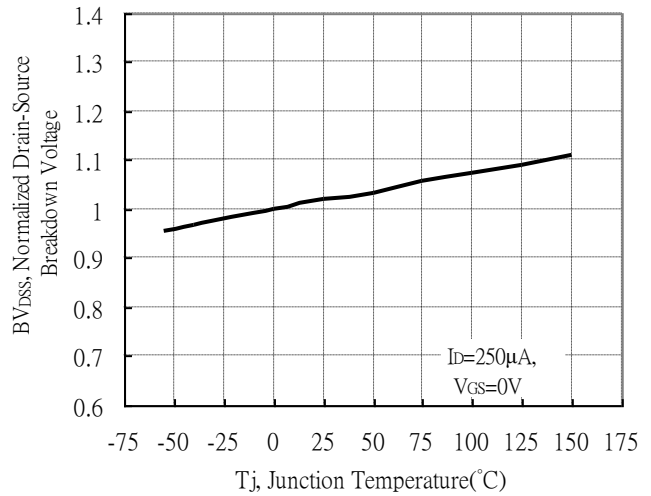
Maximum Drain Current vs Junction Temperature



Drain Current vs Gate-Source Voltage

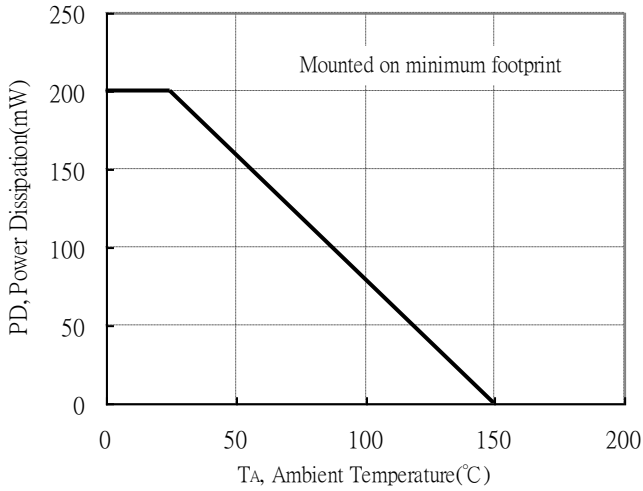


Brekdown Voltage vs Ambient Temperature

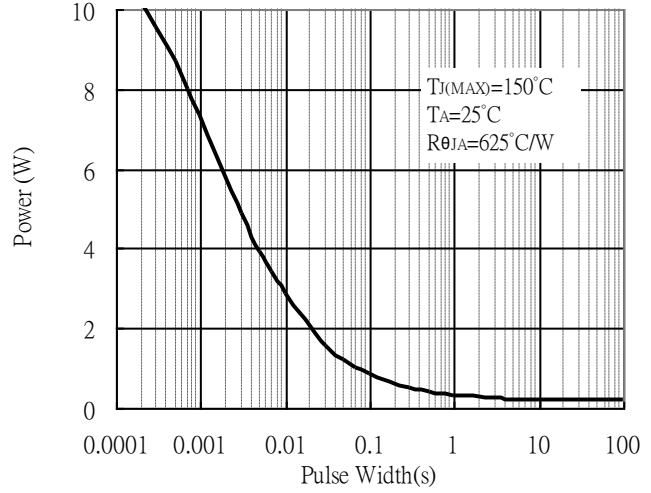


**Typical Characteristics(Cont.)**

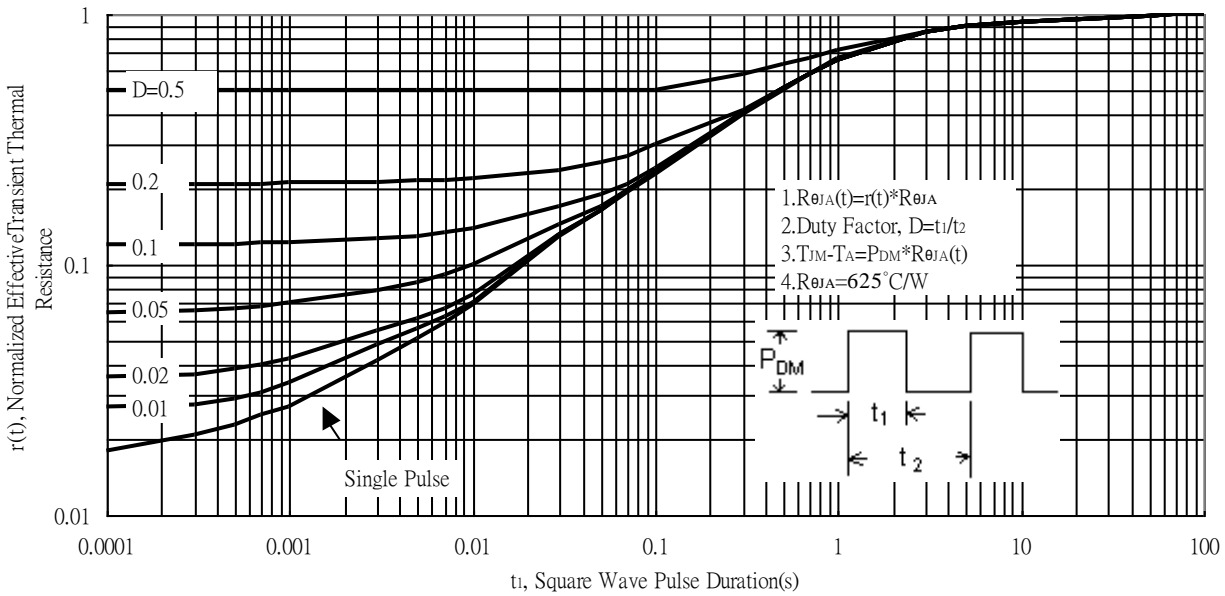
Power Derating Curve



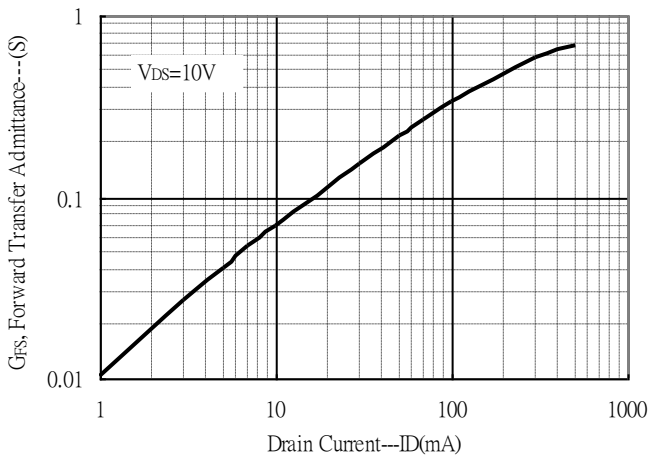
Single Pulse Power Rating, Junction to Ambient



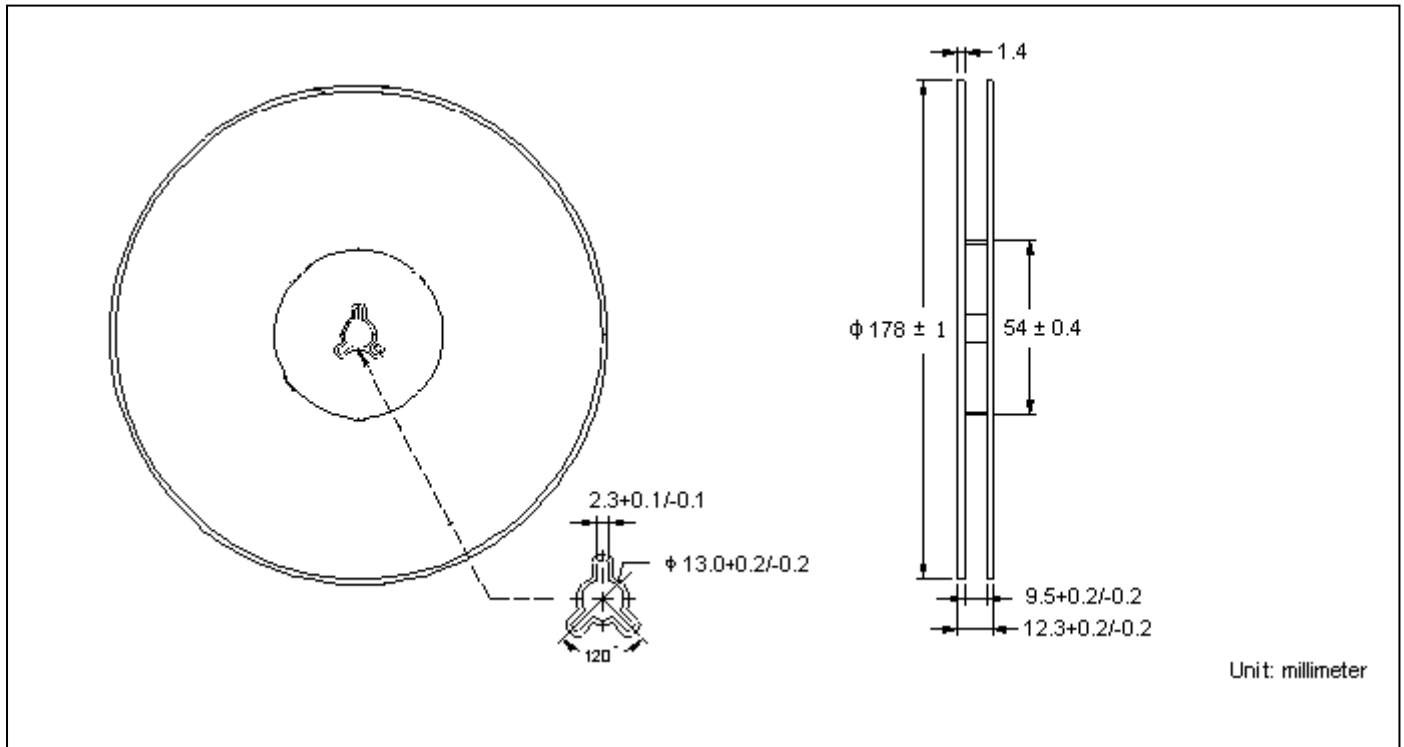
Transient Thermal Response Curves



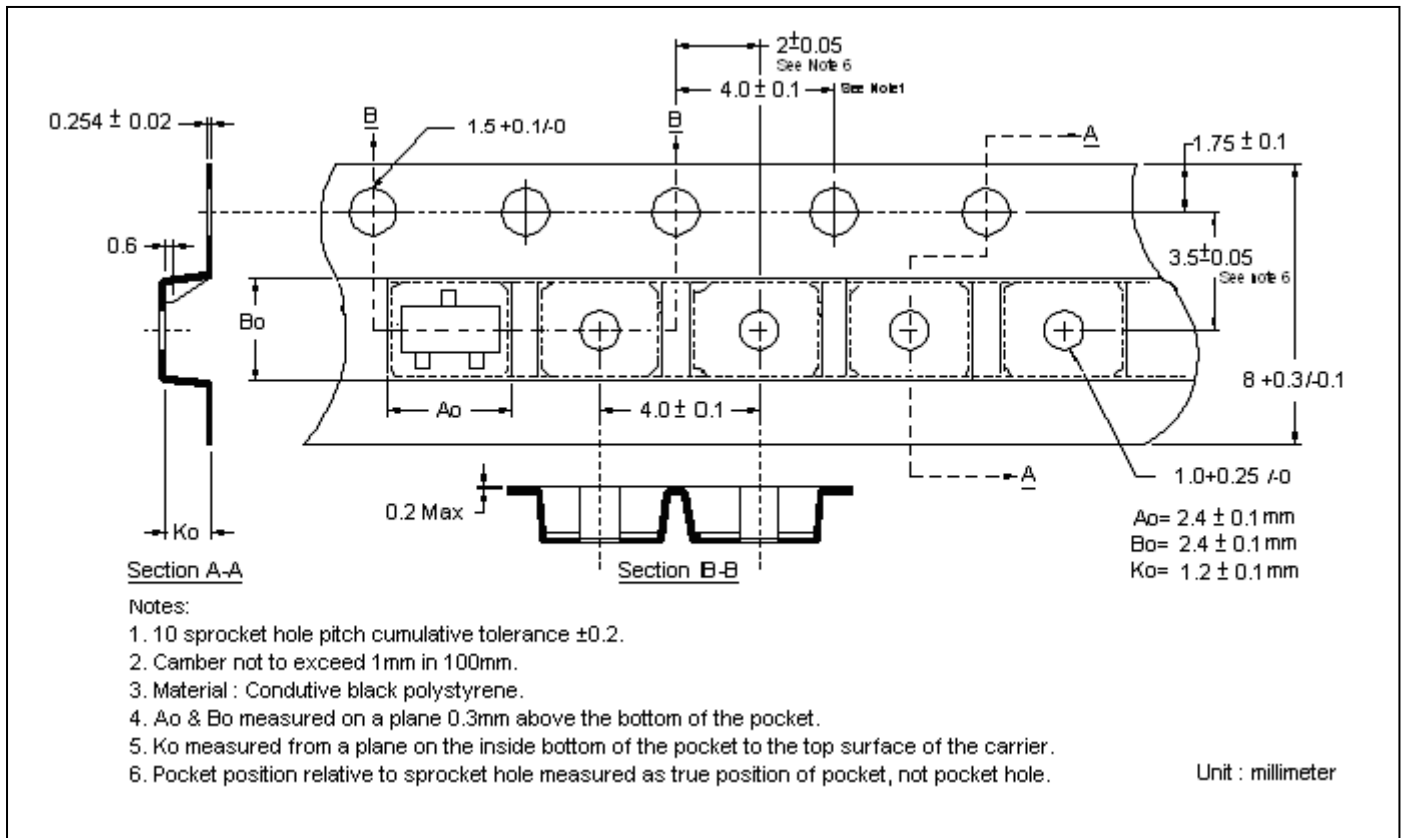
Forward Transfer Admittance vs Drain Current



**Reel Dimension**



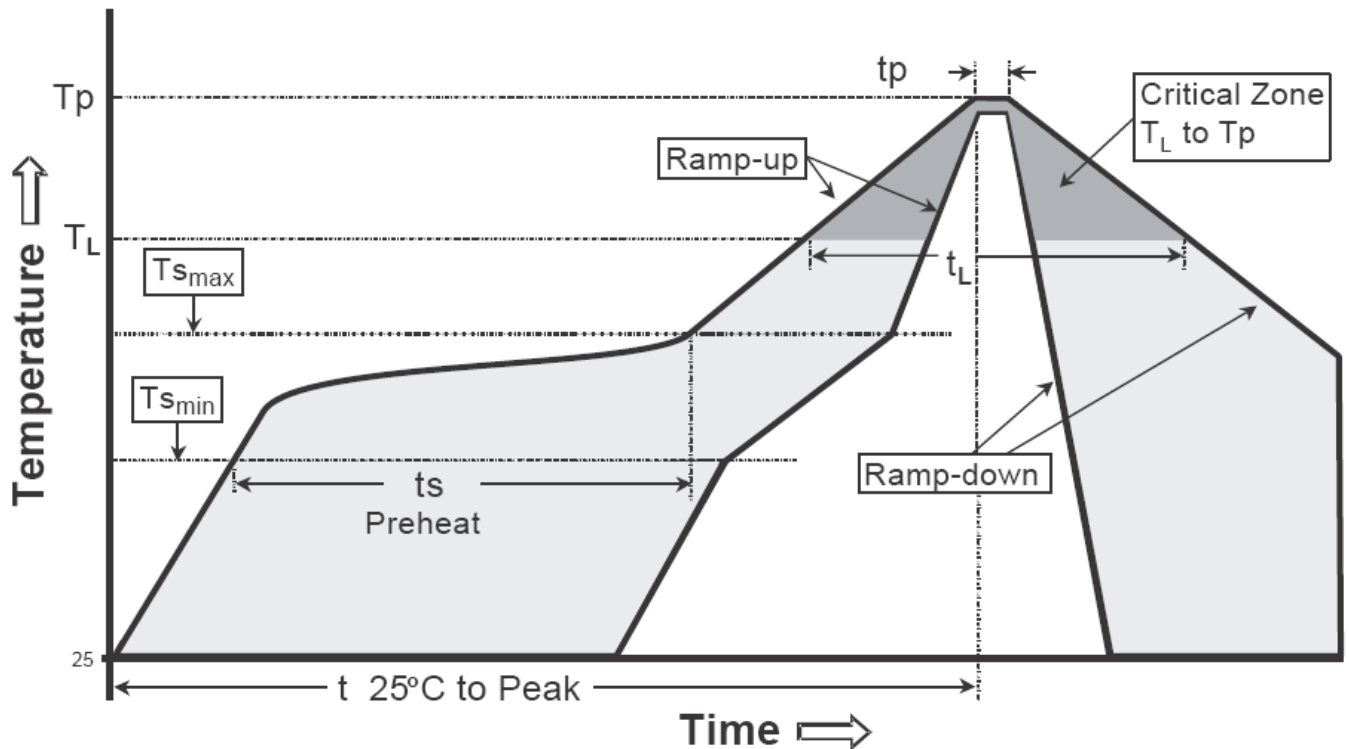
**Carrier Tape Dimension**



**Recommended wave soldering condition**

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

**Recommended temperature profile for IR reflow**

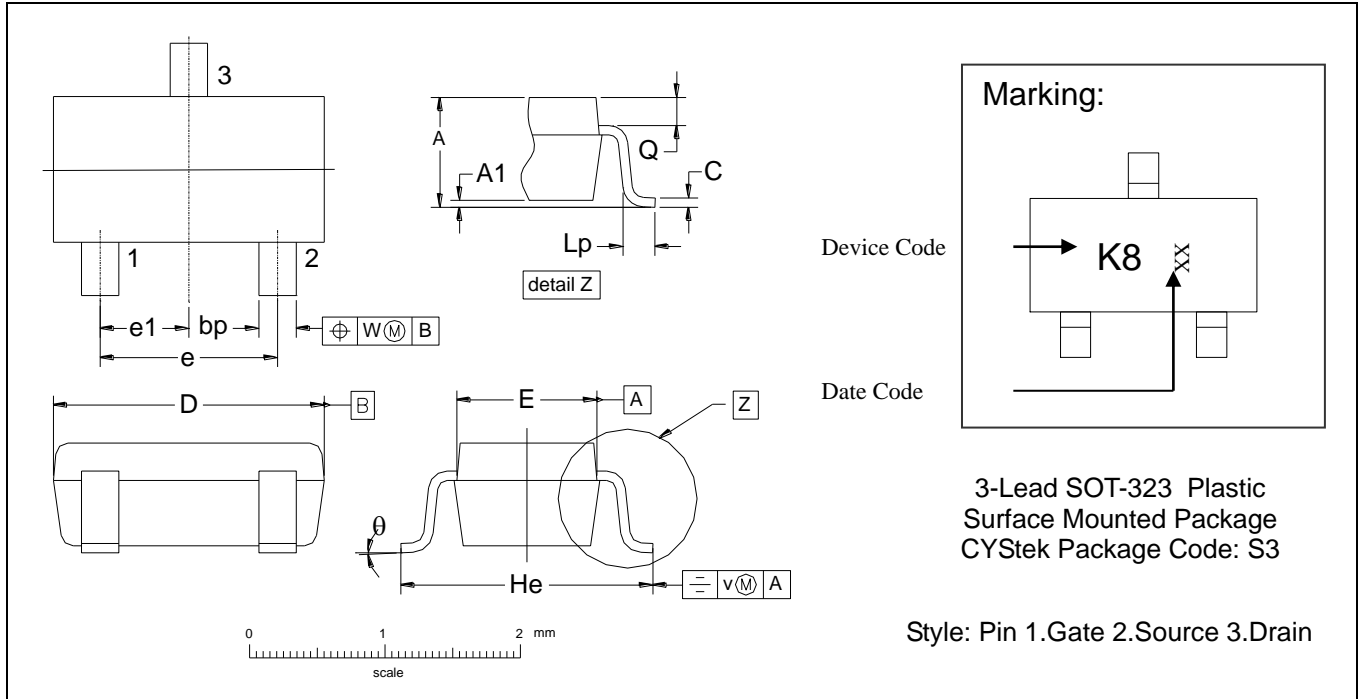


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
-Temperature Min(T <sub>s min</sub> )	100°C	150°C
-Temperature Max(T <sub>s max</sub> )	150°C	200°C
-Time(t <sub>s min</sub> to t <sub>s max</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (T <sub>L</sub> )	183°C	217°C
- Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak Temperature(T <sub>P</sub> )	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.



**SOT-323 Dimension**



DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0315	0.0433	0.80	1.10	e1	0.0256	-	0.65	-
A1	0.0000	0.0039	0.00	0.10	He	0.0787	0.0886	2.00	2.25
bp	0.0118	0.0157	0.30	0.40	Lp	0.0059	0.0177	0.15	0.45
C	0.0039	0.0098	0.10	0.25	Q	0.0051	0.0091	0.13	0.23
D	0.0709	0.0866	1.80	2.20	v	0.0079	-	0.2	-
E	0.0453	0.0531	1.15	1.35	w	0.0079	-	0.2	-
e	0.0512	-	1.3	-	θ	-	-	10°	0°

**Notes:** 1.Controlling dimension: millimeters.  
 2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.  
 3.If there is any question with packing specification or packing method, please contact your local CYStek sales office.

**Material:**

- Lead: Pure tin plated
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0

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