N -Channel Enhancement Mode Power MOSFET

MTA100N10KRI3

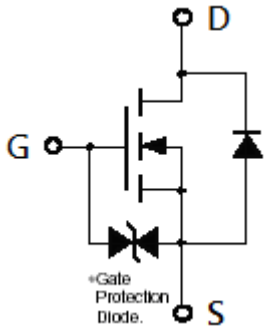
BV_{DSS}	100V
I_D@V_{GS}=10V, T_C=25°C	10A
R_{DSON}@V_{GS}=10V, I_D=2.5A	96mΩ (TYP)
R_{DSON}@V_{GS}=4.5V, I_D=2.5A	112mΩ (TYP)
R_{DSON}@V_{GS}=4V, I_D=2.5A	116mΩ (TYP)

Features

- Low Gate Charge
- Simple Drive Requirement
- ESD protected gate
- Pb-free lead plating & Halogen-free package

Equivalent Circuit

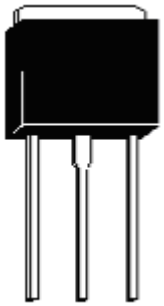
MTA100N10KRI3



G：Gate D：Drain S：Source

Outline

TO-251



G D S

Ordering Information

Device	Package	Shipping
MTA100N10KRI3-0-UA-G	TO-251 (Pb-free lead plating & Halogen-free package)	80 pcs/tube, 50 tubes/box

Environment friendly grade : S for RoHS compliant products, G for RoHS compliant and green compound products

Packing spec, UA: 80 pcs / tube, 50 tubes/box

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Tc=25°C, unless otherwise noted)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V		I_D	10	A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V			6.3	
Pulsed Drain Current	*1	I_{DM}	20	
Avalanche Current		I_{AS}	10	
Avalanche Energy @ L=0.5mH, I_D=8A, V_{DD}=50V	*3	E_{AS}	16	mJ
Repetitive Avalanche Energy @ L=0.05mH	*2	E_{AR}	3	
Total Power Dissipation @T_C=25℃		P_D	30	W
Total Power Dissipation @T_C=100℃			12	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150	°C

Note : *1. Pulse width limited by maximum junction temperature
*2. Duty cycle ≤ 1%
*3. 100% tested by L=0.1mH, I_{AS}=8A, V_{GS}=10V, V_{DD}=25V

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	4.1	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	50 (Note)	
		110	

Note : When the device is mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design.

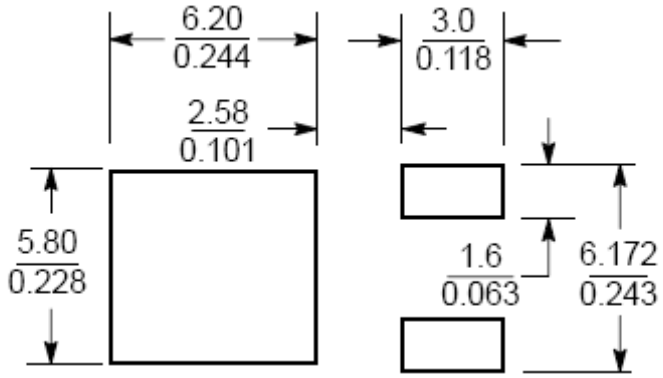
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	0.6	-	2.2		V_{DS} =V_{GS}, I_D=250μA
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS} =80V, V_{GS} =0V
	-	-	25		V_{DS} =80V, V_{GS} =0V, T_J=125°C
$R_{DS(ON)}$ *1	-	96	140	mΩ	V_{GS} =10V, I_D=2.5A
	-	112	165		V_{GS} =4.5V, I_D=2.5A
	-	116	300		V_{GS} =4V, I_D=2.5A
G_{FS} *1	-	6	-	S	V_{DS} =10V, I_D=5A
Dynamic					
Qg *1, 2	-	8.0	-	nC	I_D=2.5A, V_{DS}=80V, V_{GS}=10V
Qgs *1, 2	-	1.2	-		
Qgd *1, 2	-	1.5	-		

$t_{d(ON)}$ *1, 2	-	5	-	ns	V_{DS}=50V, I_D=2.5A, V_{GS}=10V, R_G=1Ω
tr *1, 2	-	15.8	-		
$t_{d(OFF)}$ *1, 2	-	22	-		
t_f *1, 2	-	5	-		
Ciss	-	425	-	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Coss	-	30	-		
Crss	-	17	-		
Rg	-	4.1	-	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	10	A	
I_{SM} *3	-	-	20		
V_{SD} *1	-	0.9	1.2	V	I_S=5A, V_{GS}=0V
trr	-	17.4	-	ns	I_F=2.5A, dI_F/dt=100A/μs
Qrr	-	14.6	-	nC	

Note : *1.Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%
*2.Independent of operating temperature
*3.Pulse width limited by maximum junction temperature.

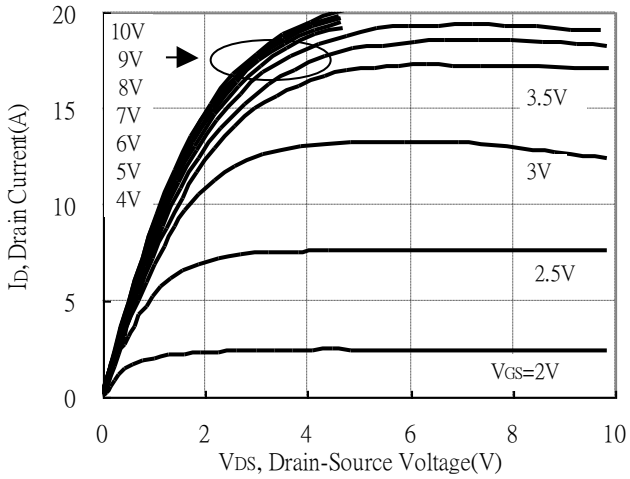
Recommended soldering footprint



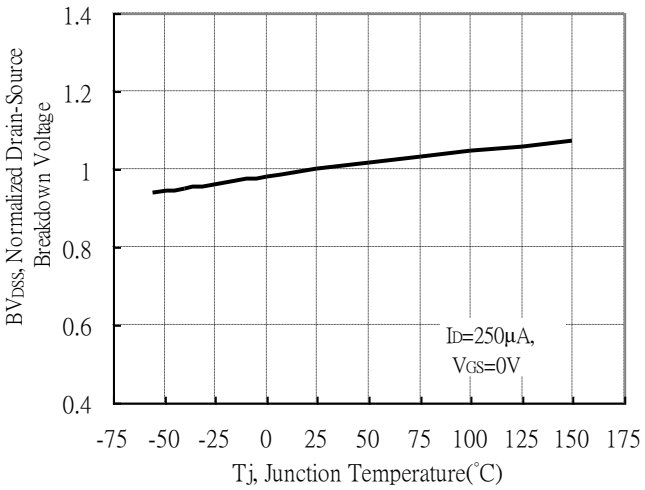
Unit (mm / inch)

Typical Characteristics

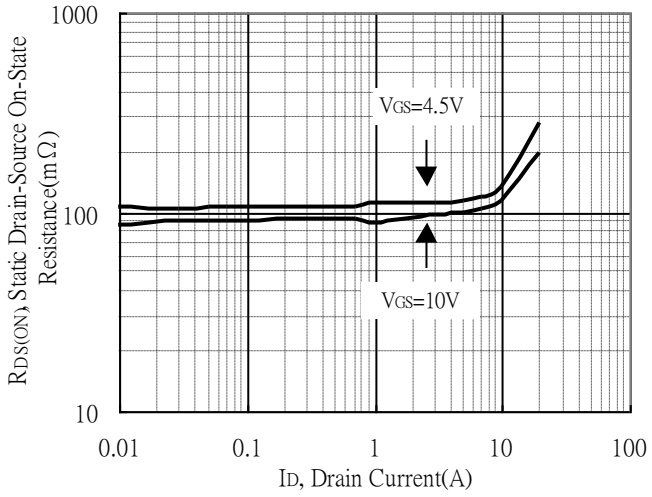
Typical Output Characteristics



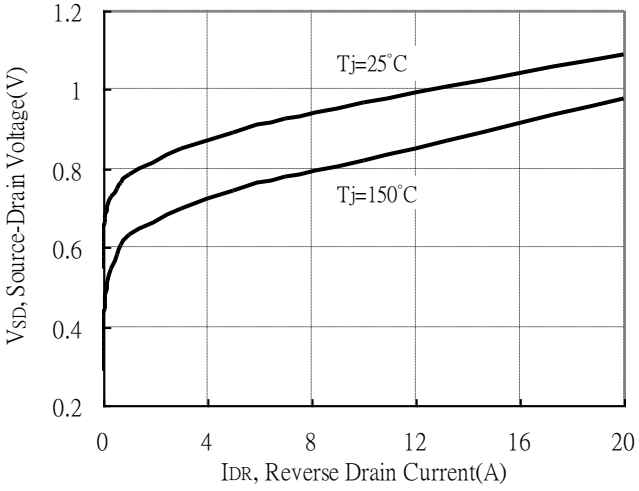
Brekdown Voltage vs Ambient Temperature



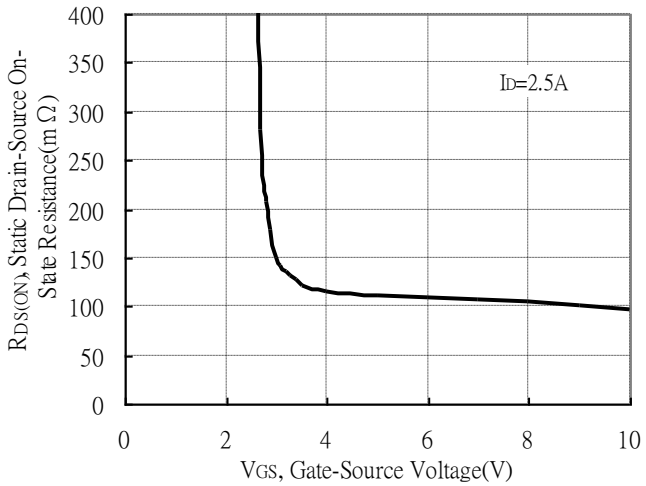
Static Drain-Source On-State resistance vs Drain Current



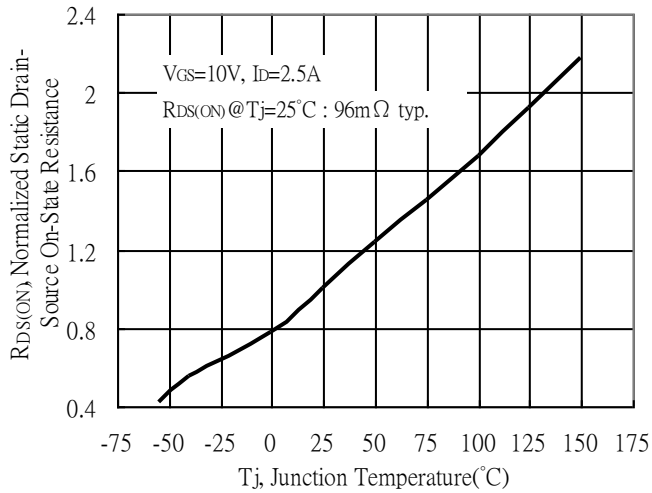
Reverse Drain Current vs Source-Drain Voltage



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

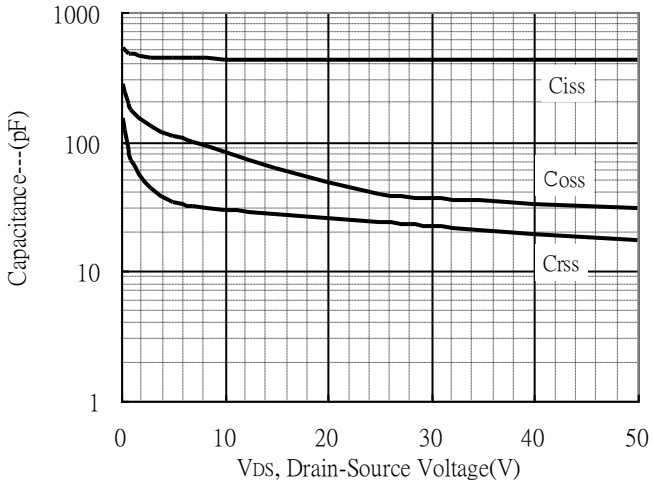


Drain-Source On-State Resistance vs Junction Tempearture

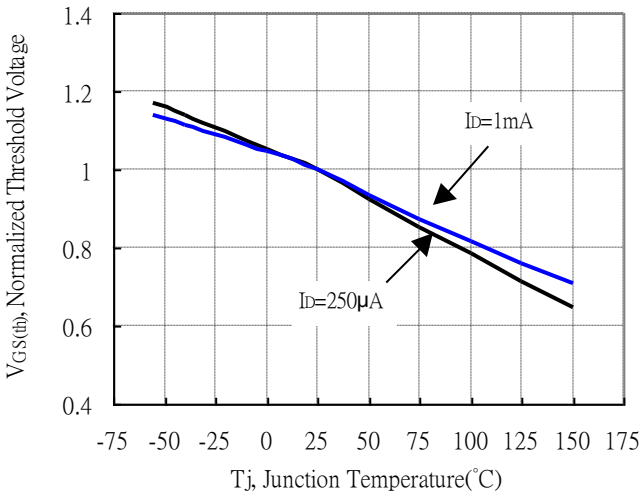


Typical Characteristics(Cont.)

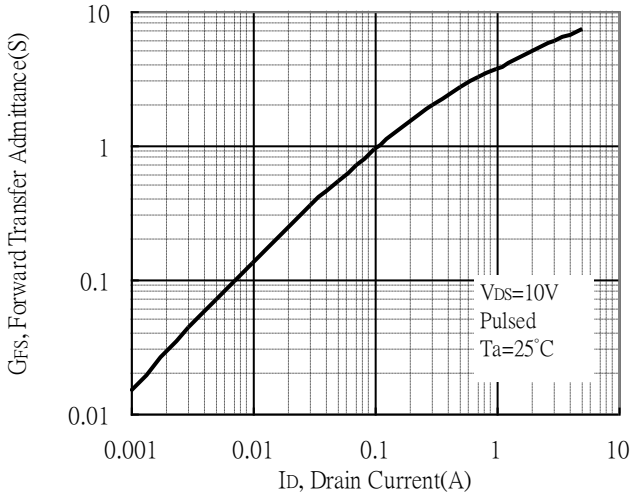
Capacitance vs Drain-to-Source Voltage



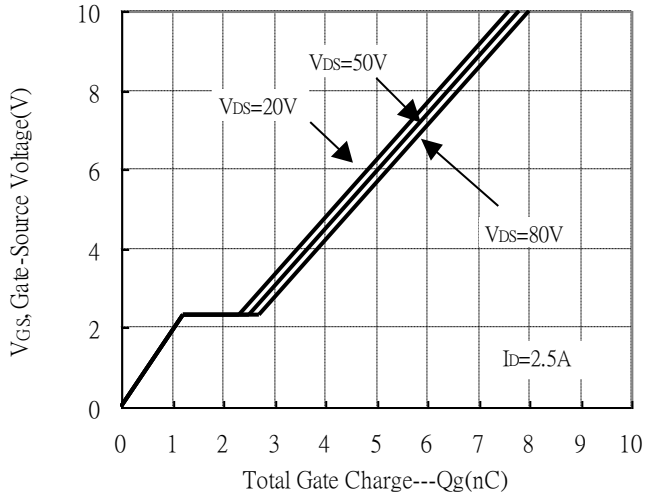
NormalizedThreshold Voltage vs Junction Tempearture



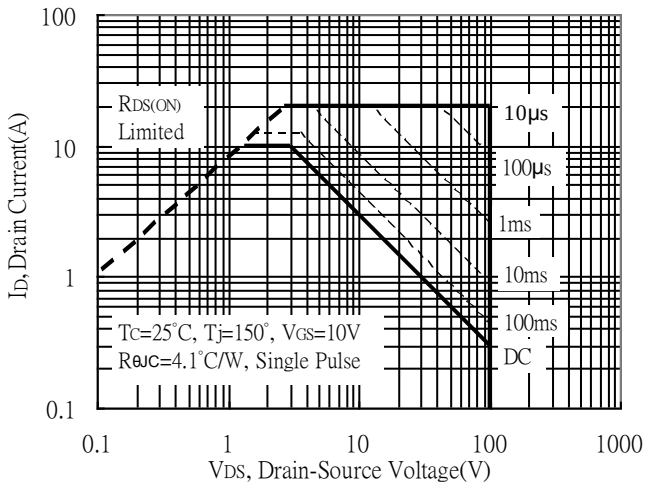
Forward Transfer Admittance vs Drain Current



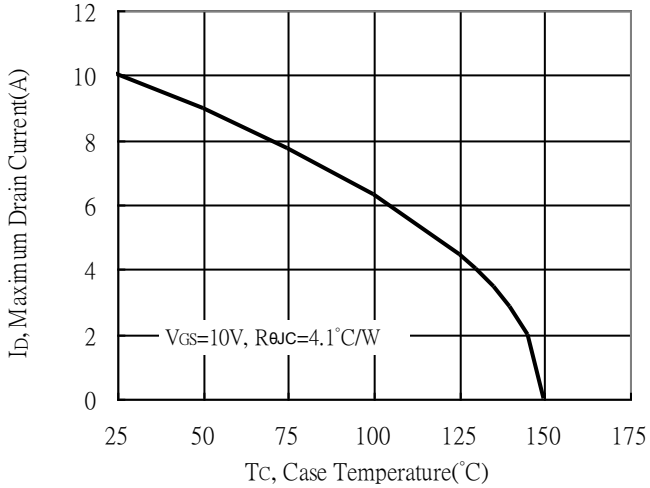
Gate Charge Characteristics



Maximum Safe Operating Area

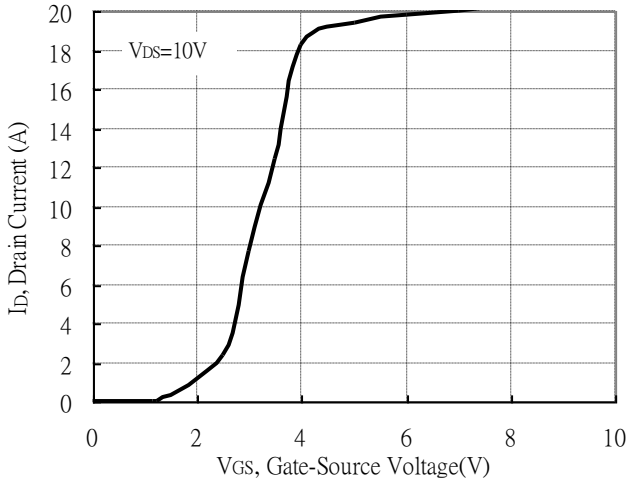


Maximum Drain Current vs Case Temperature

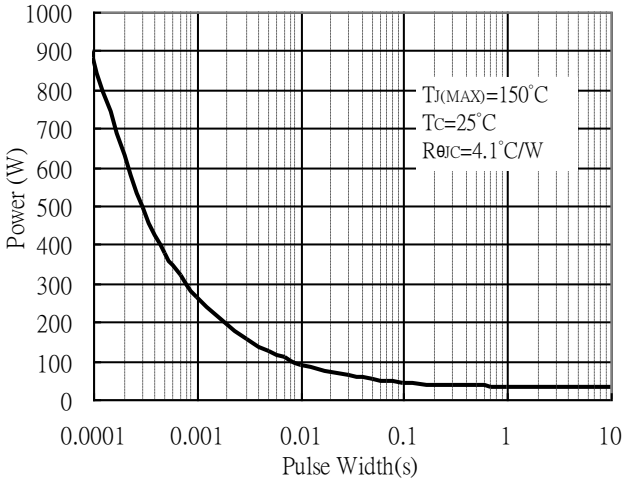


Typical Characteristics(Cont.)

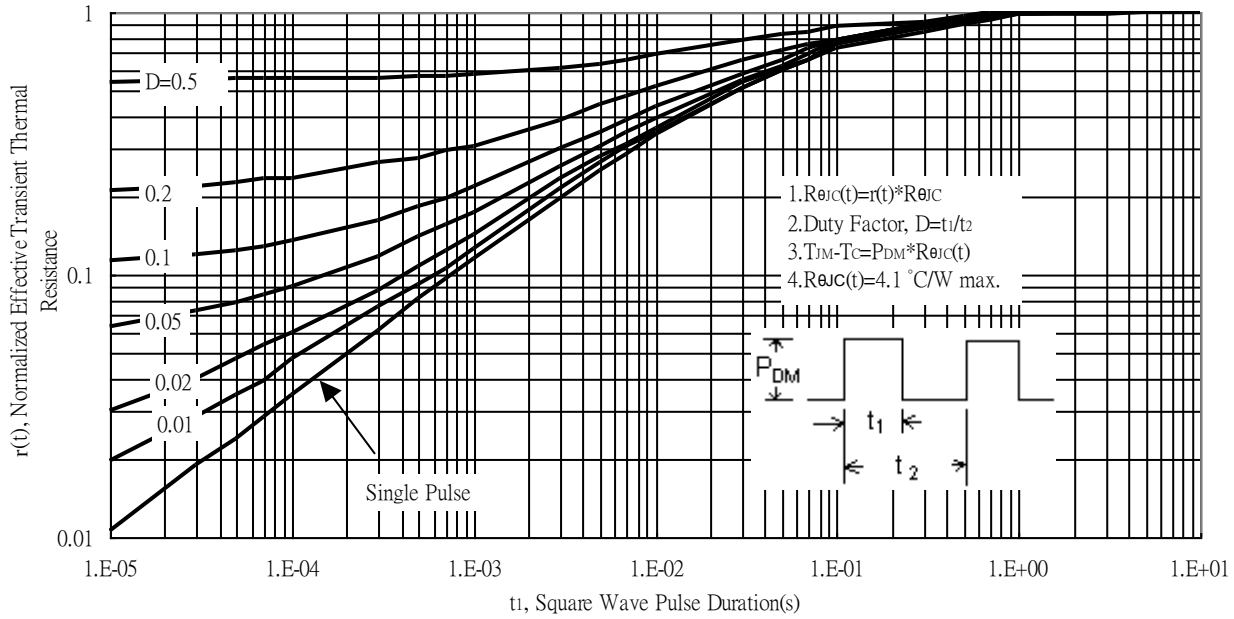
Typical Transfer Characteristics



Single Pulse Power Rating, Junction to Case



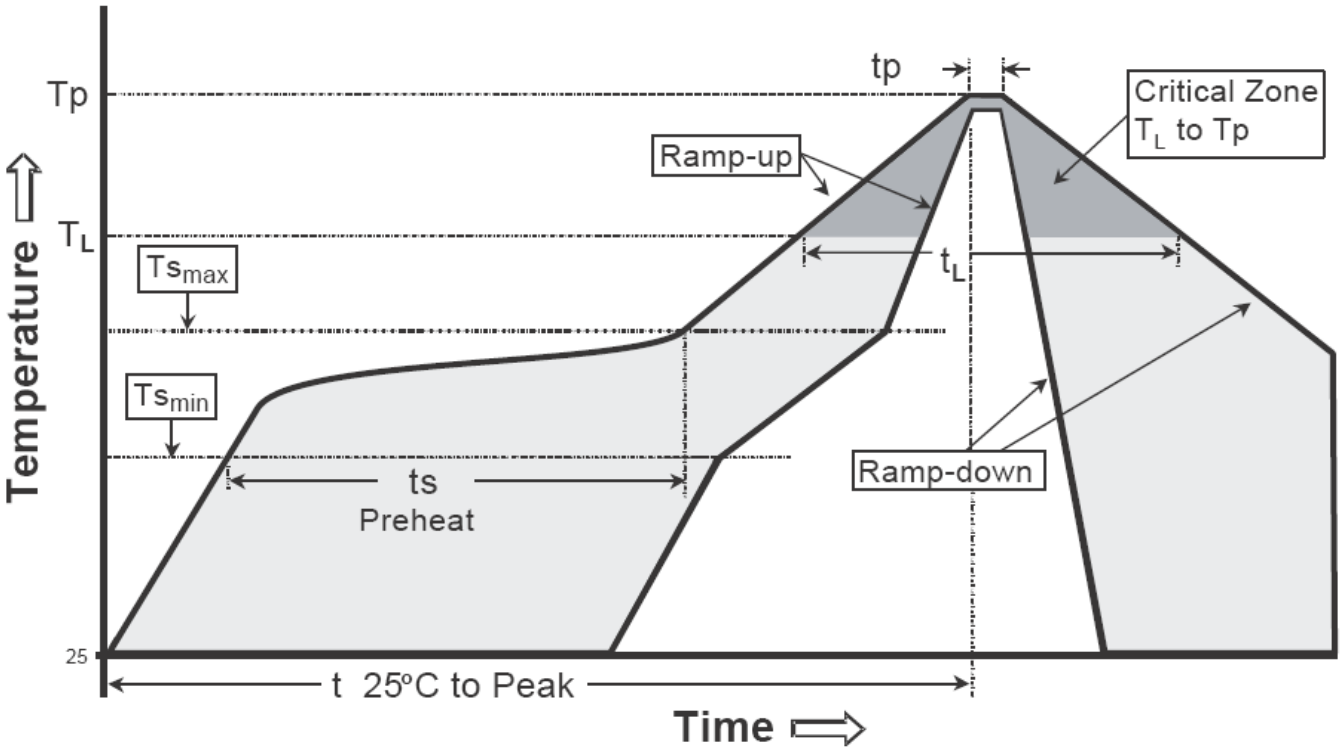
Transient Thermal Response Curves



Recommended wave soldering condition

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

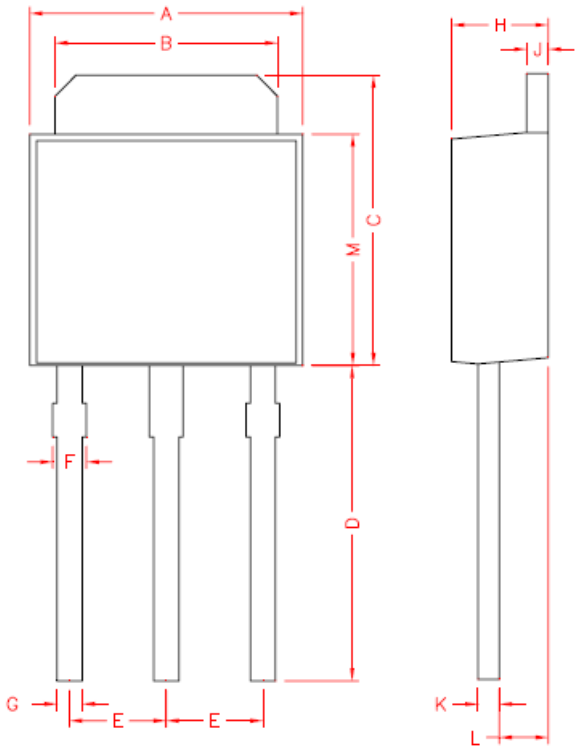
Recommended temperature profile for IR reflow

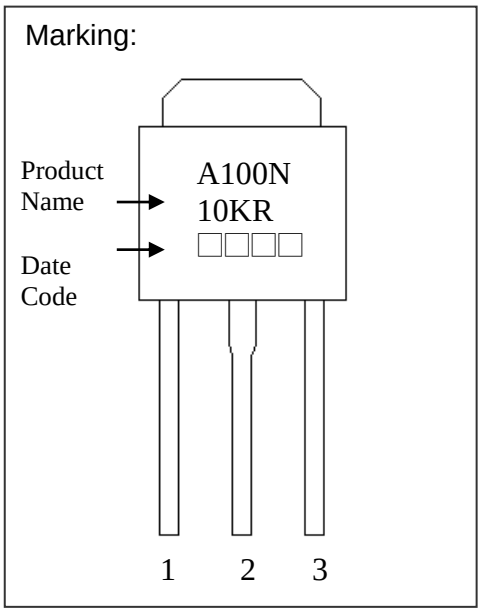


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature(T_P)	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.

TO-251 Dimension





Style: Pin 1.Gate 2.Drain 3.Source

3-Lead TO-251 Plastic Package
CYStek Package Code: I3

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	6.40	6.80	0.252	0.268	G	0.50	0.70	0.020	0.028
B	5.20	5.50	0.205	0.217	H	2.20	2.40	0.087	0.094
C	6.80	7.20	0.268	0.283	J	0.45	0.55	0.018	0.022
D	7.20	7.80	0.283	0.307	K	0.45	0.60	0.018	0.024
E	2.30 REF		0.091 REF		L	0.90	1.50	0.035	0.059
F	0.60	0.90	0.024	0.035	M	5.40	5.80	0.213	0.228

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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