N -Channel Enhancement Mode Power MOSFET

MTDA0N10J3

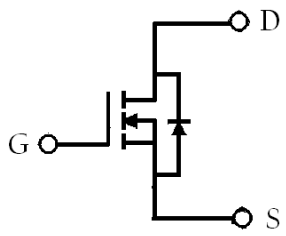
BV_{DSS}		100V
I_D @ V_{GS}=10V, T_C=25°C		16A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=12A	80mΩ
	V_{GS}=5V, I_D=10A	96mΩ

Features

- Low Gate Charge
- Simple Drive Requirement
- Pb-free lead plating and halogen-free package

Equivalent Circuit

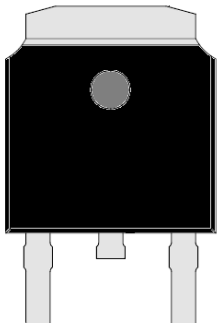
MTDA0N10J3



G：Gate D：Drain
S：Source

Outline

TO-252(DPAK)



G D S

Ordering Information

Device	Package	Shipping
MTDA0N10J3-0-T3-G	TO-252 (Pb-free lead plating and halogen-free package)	2500 pcs / Tape & Reel

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

Packing spec, T3 : 2500 pcs / tape & reel, 13” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (T_C=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 @ V_{GS}=10V, T_C=25°C (Note 1)	I_D	16	A
Continuous Drain Current @ V_{GS}=10V, T_C=100°C (Note 1)		11	
Continuous Drain Current @ V_{GS}=10V, T_A=25°C (Note 2)		3.7	
Continuous Drain Current @ V_{GS}=10V, T_A=100°C (Note 2)		2.3	
Pulsed Drain Current (Note 3)	I_{DM}	64	
Avalanche Current (Note 3)	I_{AS}	12	
Avalanche Energy @ L=0.5mH, I_D=11A, R_G=25Ω (Note 2)	E_{AS}	30	mJ
Repetitive Avalanche Energy@ L=0.1mH (Note 3)	E_{AR}	6	
Total Power Dissipation @T_C=25℃ (Note 1)	P_D	60	W
Total Power Dissipation @T_C=100℃ (Note 1)		30	
Total Power Dissipation @T_A=25℃ (Note 2)	P_{DSM}	2.5	
Total Power Dissipation @T_A=70℃ (Note 2)		1.6	
Operating Junction and Storage Temperature Range	Tj, Tstg	-55~+175	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	2.5	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	$R_{\theta JA}$	50	
Thermal Resistance, Junction-to-ambient, max (Note 4)		110	

Note : 1.The power dissipation P_D is based on $T_{J(MAX)}$=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation PDSM is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.

3. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=175°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

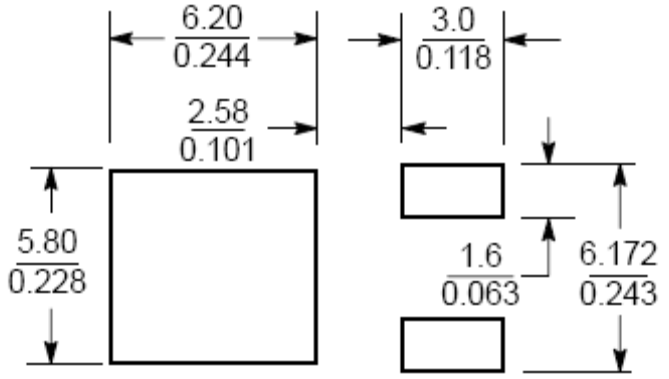
4. When mounted on the minimum pad size recommended (PCB mount), t≤10s.

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
$V_{GS(th)}$	1	2.2	3		V_{DS} =V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =80V, V_{GS} =0V
	-	-	25		V_{DS} =80V, V_{GS} =0V, T_J=125°C
$R_{DS(ON)}$ *1	-	80	105	mΩ	V_{GS} =10V, I_D=12A
	-	96	125		V_{GS} =5V, I_D=10A
G_{FS} *1	-	12	-	S	V_{DS} =5V, I_D=12A
Dynamic					
Qg *1, 2	-	5.5	-	nC	I_D=10A, V_{DS}=50V, V_{GS}=10V
Qgs *1, 2	-	1.3	-		
Qgd *1, 2	-	2.1	-		
$t_{d(ON)}$ *1, 2	-	4	-	ns	V_{DS}=50V, I_D=1A, V_{GS}=10V, R_G=6Ω
tr *1, 2	-	15	-		
$t_{d(OFF)}$ *1, 2	-	15	-		
t_f *1, 2	-	3.9	-		
Ciss	-	396	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	55	-		
Crss	-	23	-		
Source-Drain Diode					
I_S *1	-	-	12	A	
I_{SM} *3	-	-	30		
V_{SD} *1	-	0.89	1.3	V	I_F=I_S, V_{GS}=0V
trr	-	35	-	ns	I_F=10A, dI_F/dt=100A/μs
Qrr	-	22	-	nC	

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

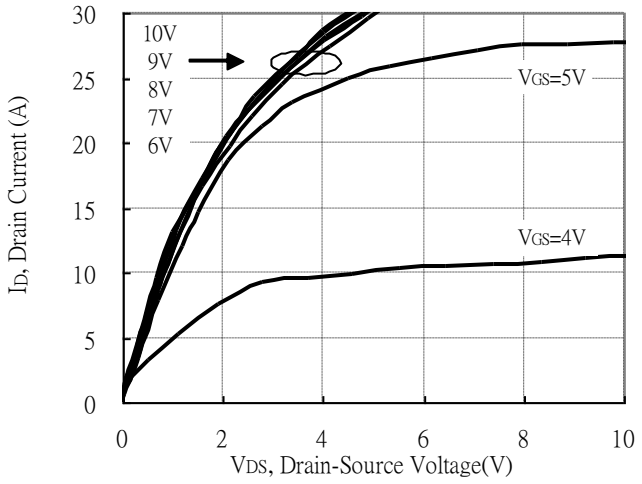
Recommended soldering footprint



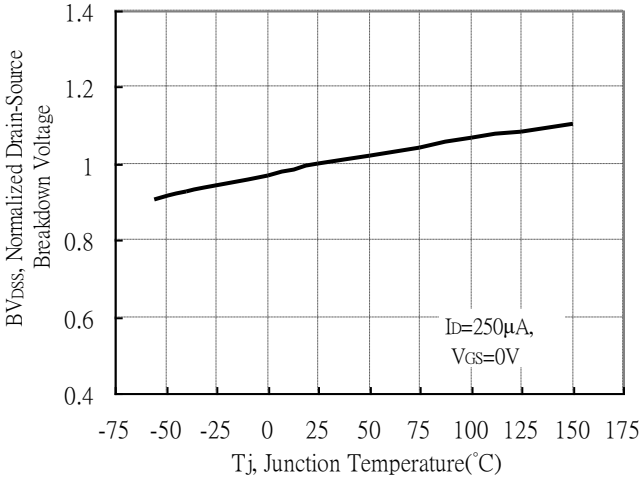
Unit (mm / inch)

Typical Characteristics

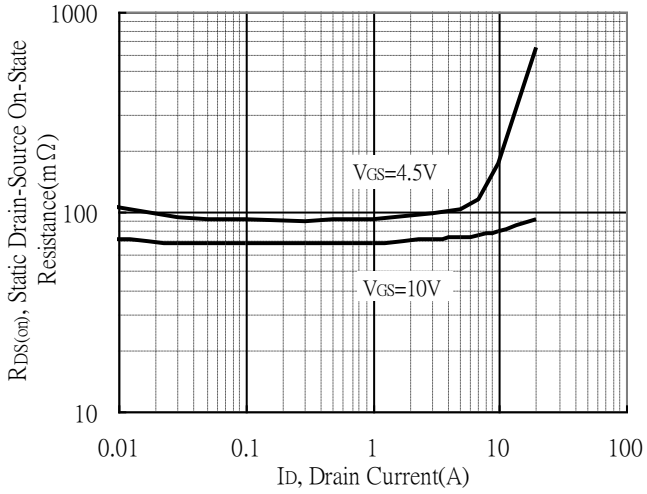
Typical Output Characteristics



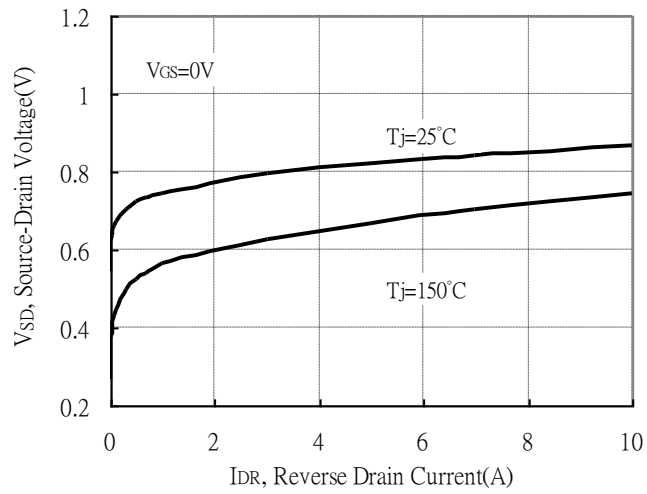
Brekdown Voltage vs Ambient Temperature



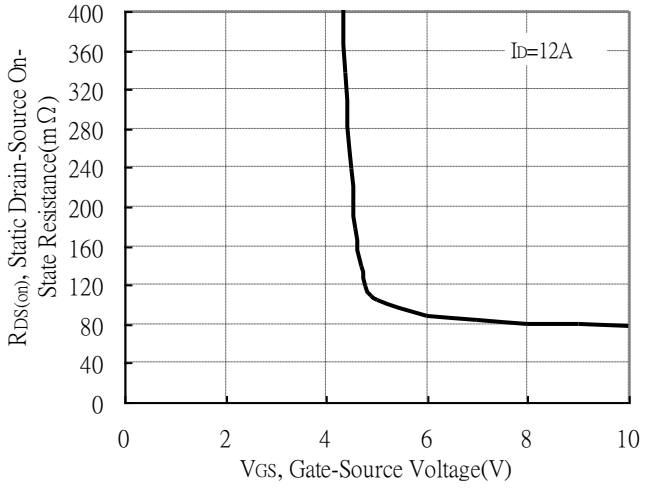
Static Drain-Source On-State resistance vs Drain Current



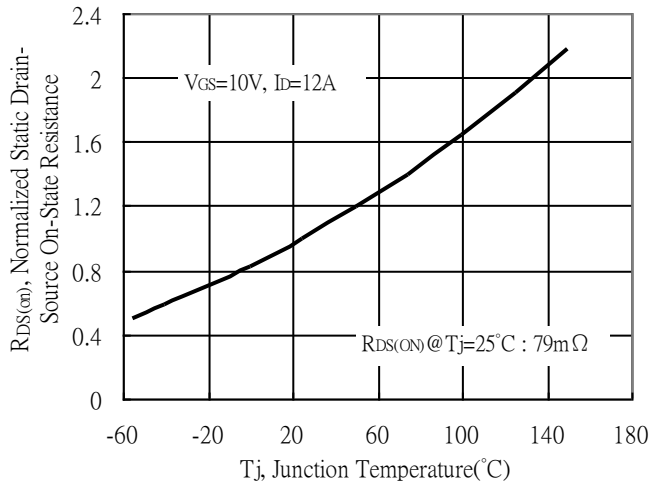
Reverse Drain Current vs Source-Drain Voltage



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

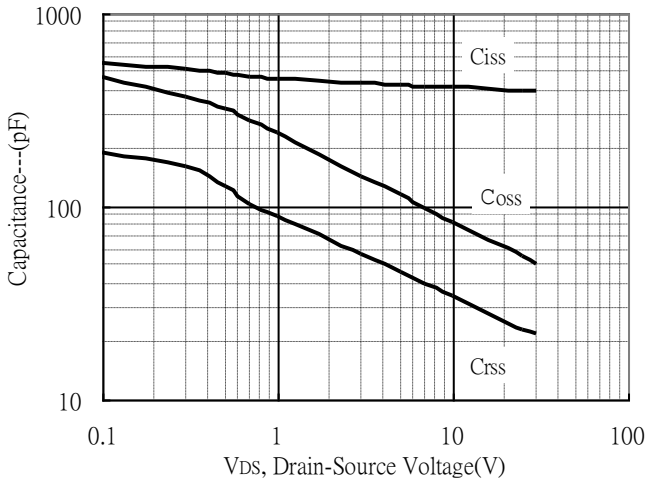


Drain-Source On-State Resistance vs Junction Tempearture

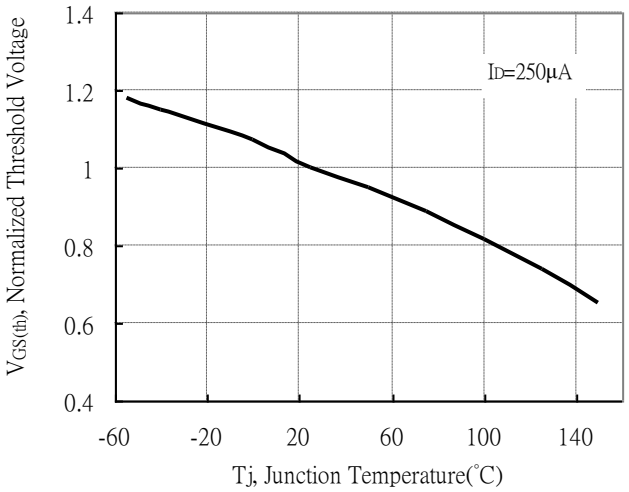


Typical Characteristics(Cont.)

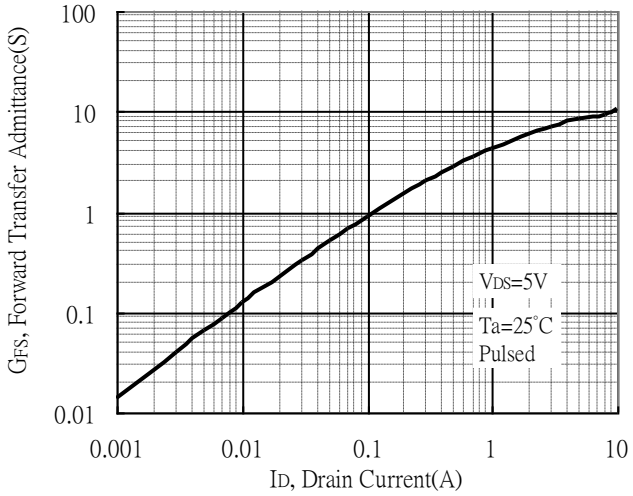
Capacitance vs Drain-to-Source Voltage



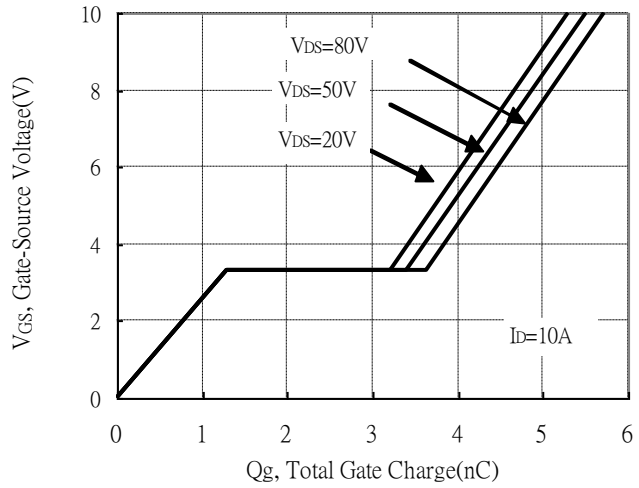
Threshold Voltage vs Junction Tempearture



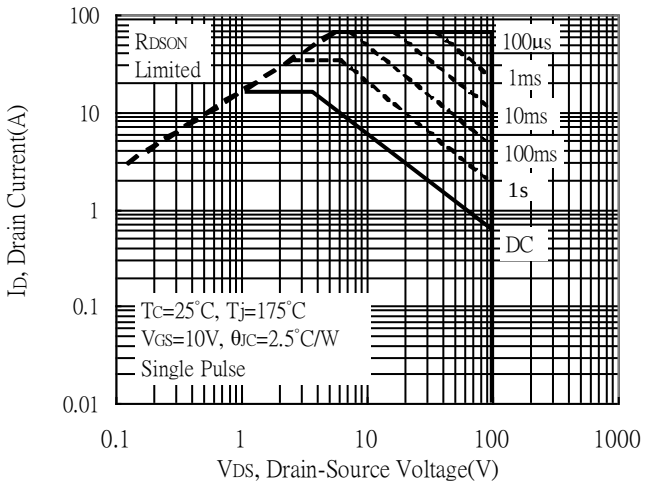
Forward Transfer Admittance vs Drain Current



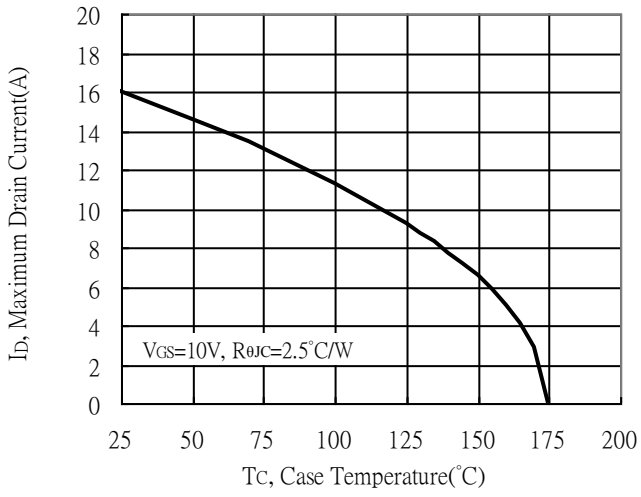
Gate Charge Characteristics



Maximum Safe Operating Area



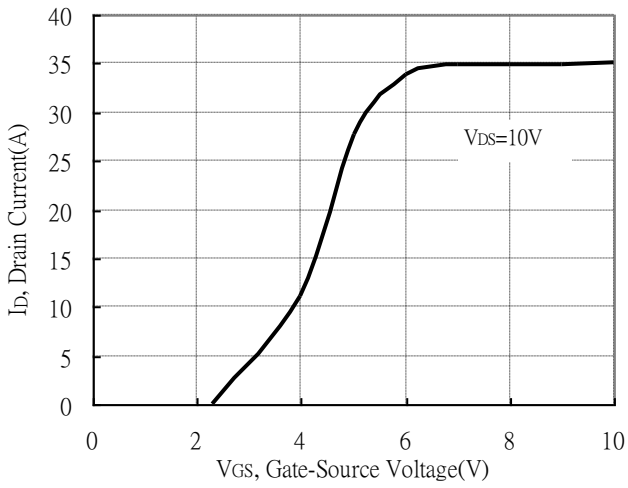
Maximum Drain Current vs Case Temperature



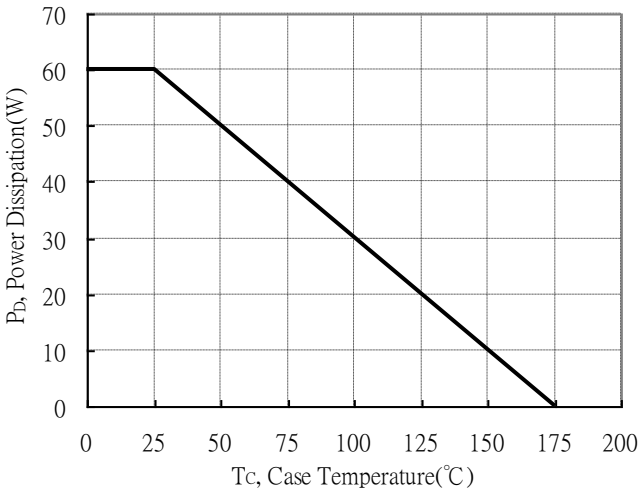
\

Typical Characteristics(Cont.)

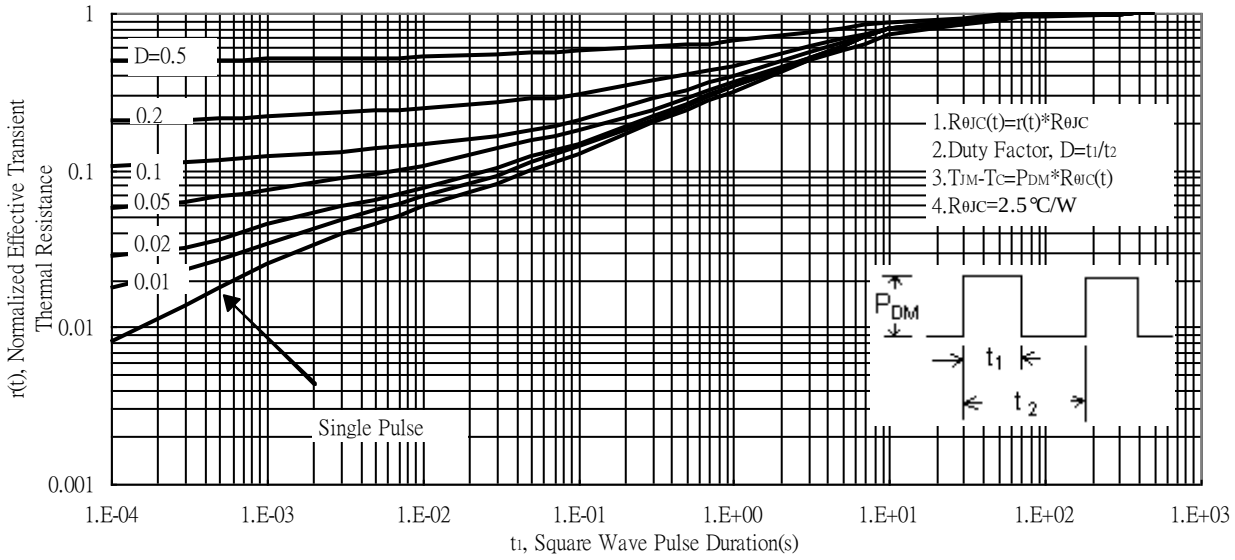
Typical Transfer Characteristics



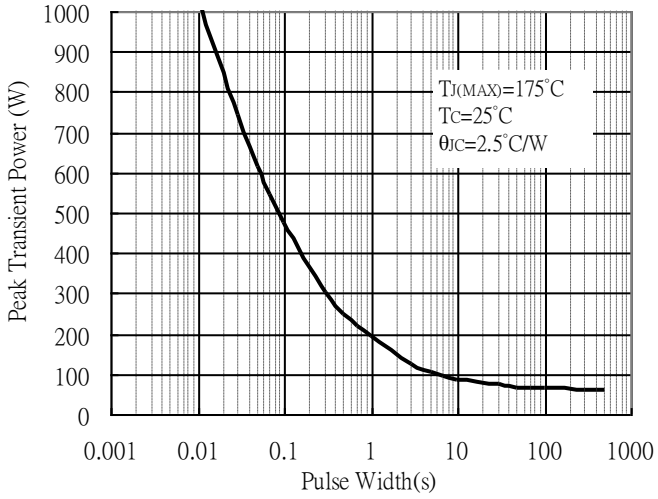
Power Derating Curve



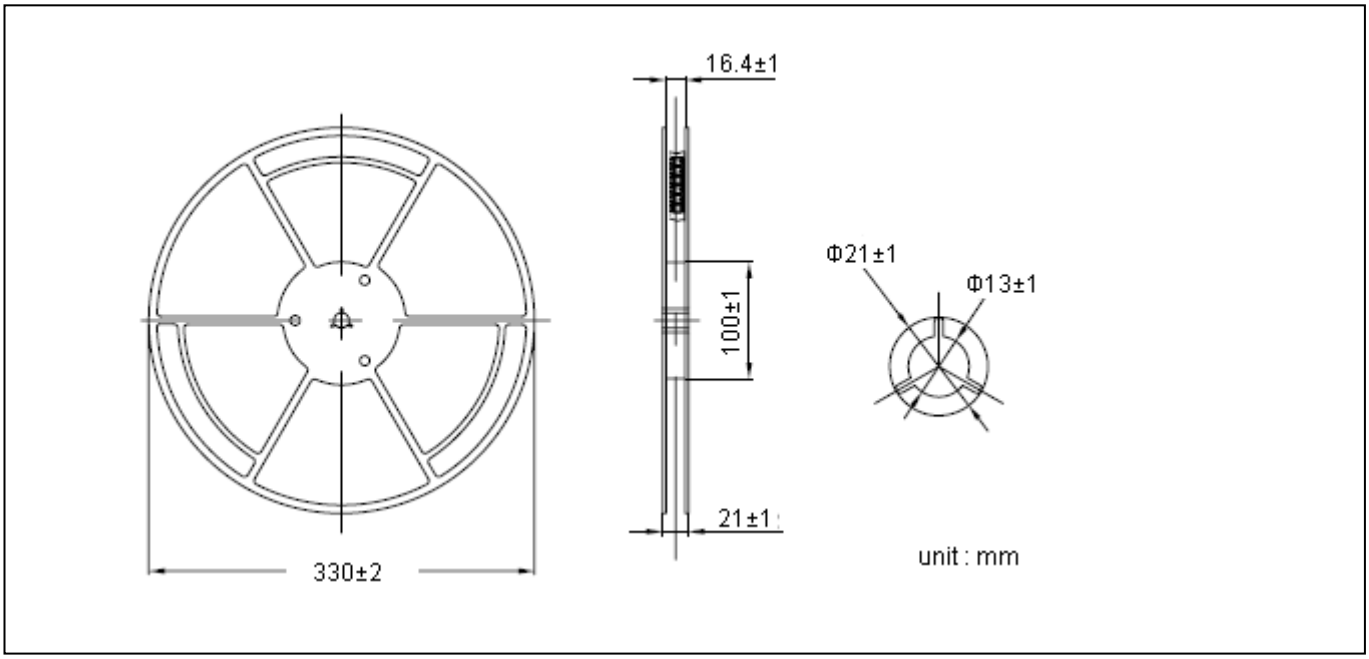
Transient Thermal Response Curves



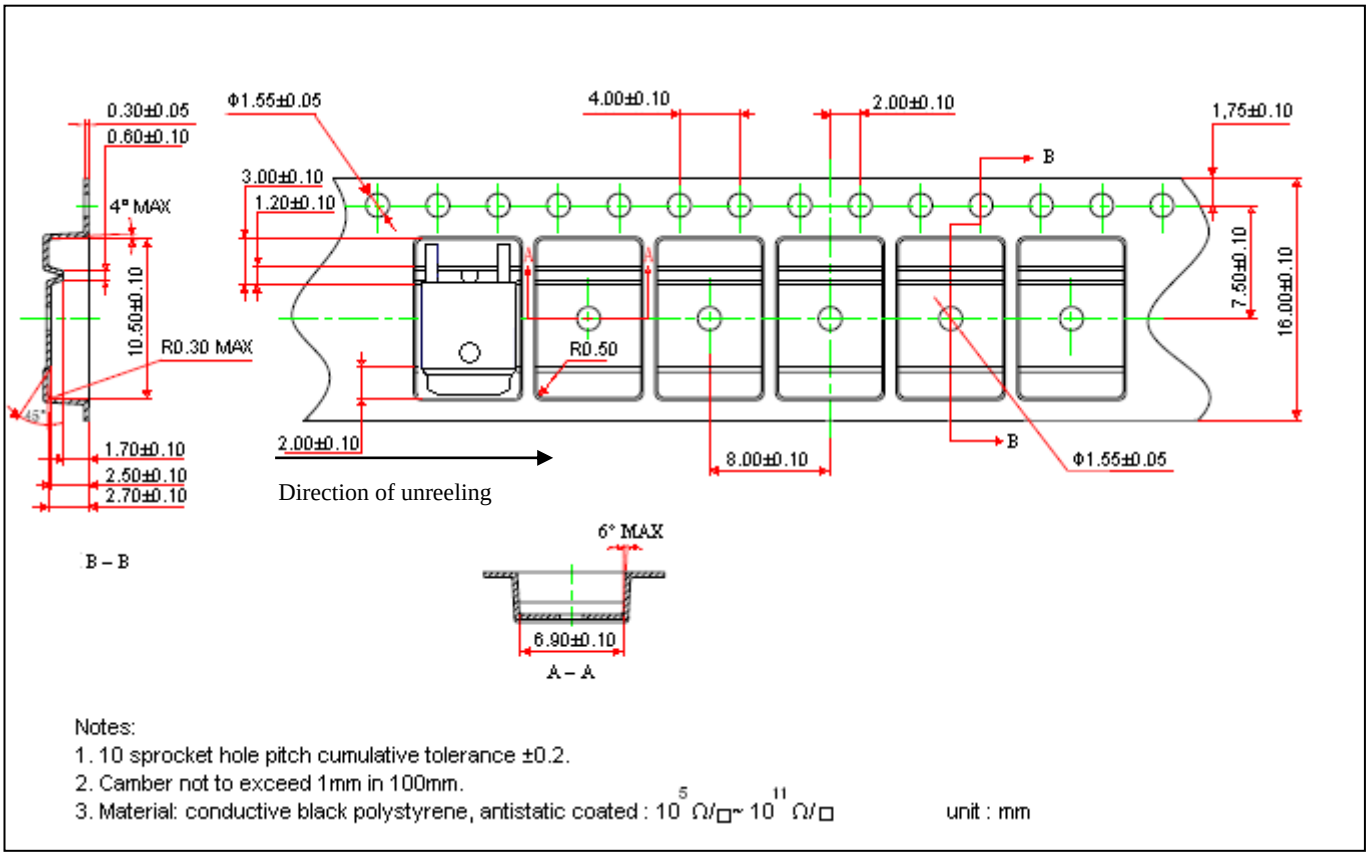
Single Pulse Maximum Power Dissipation



Reel Dimension



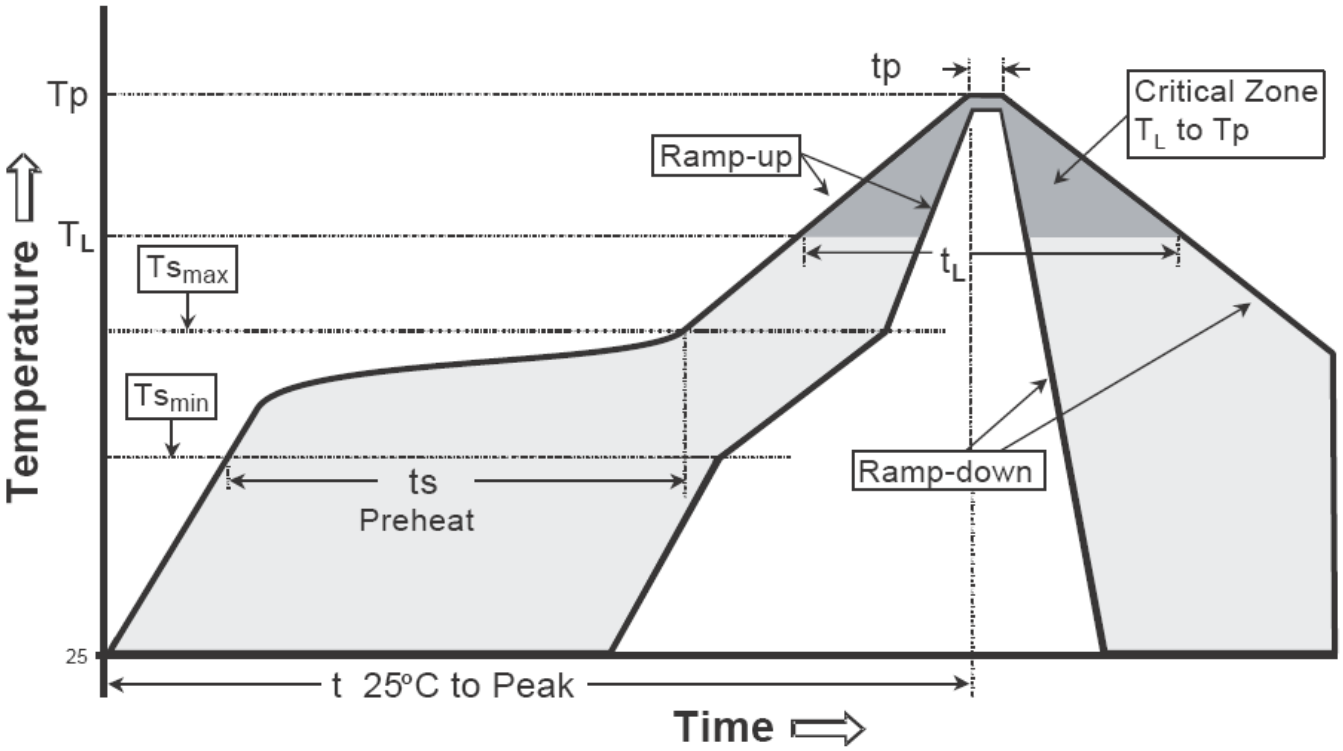
Carrier Tape Dimension



Recommended wave soldering condition

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

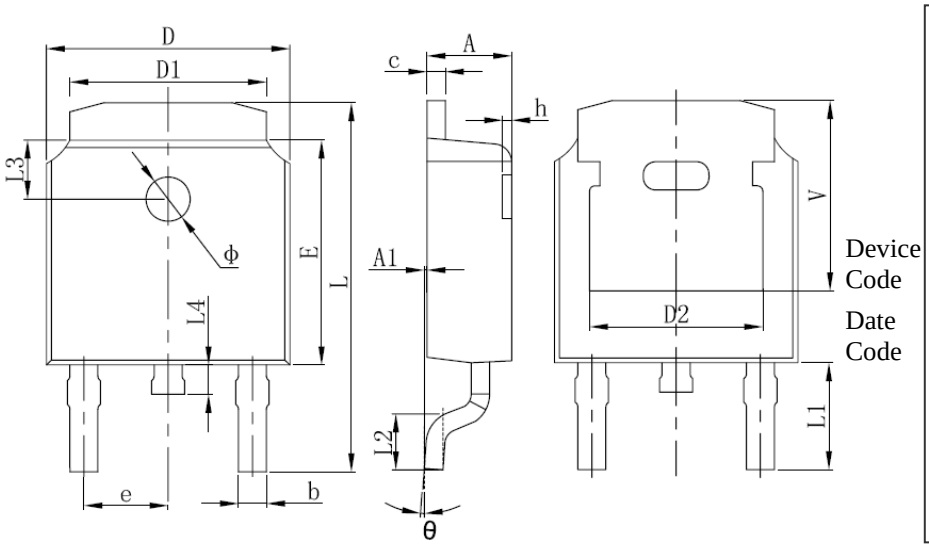
Recommended temperature profile for IR reflow

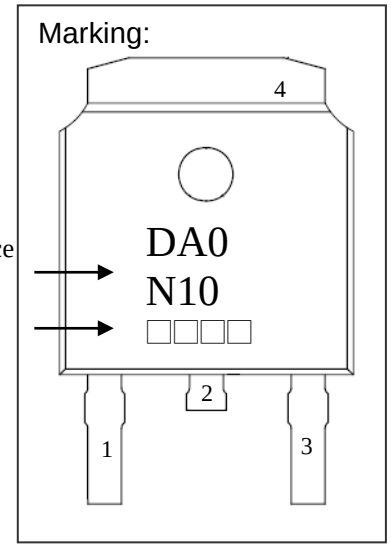


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (T_L) − 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-252 Dimension





3-Lead TO-252 Plastic Surface Mount Package
CYStek Package Code: J3

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

Date Code :
First Code : Last digit of Christian Year
Second Code : Month Code : Jan→A, Feb→B, Mar→C, Apr→D, May→E, Jun→F, Jul→G,
Aug→H, Sep→J, Oct→K, Nov→L, Dec→M
Last Two Codes : Production Serial Code, 01~99

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.087	0.094	2.200	2.400	L	0.382	0.406	9.712	10.312
A1	0.000	0.005	0.000	0.127	L1	0.114 REF		2.900 REF	
b	0.025	0.030	0.635	0.770	L2	0.055	0.067	1.400	1.700
c	0.018	0.023	0.460	0.580	L3	0.063 REF		1.600 REF	
D	0.256	0.264	6.500	6.700	L4	0.024	0.039	0.600	1.000
D1	0.201	0.215	5.100	5.460	Φ	0.043	0.051	1.100	1.300
D2	0.190 REF		4.830 REF		θ	0°	8°	0°	8°
E	0.236	0.244	6.000	6.200	h	0.000	0.012	0.000	0.300
e	0.086	0.094	2.186	2.386	v	0.207 REF		5.250 REF	

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.