N-Channel Enhancement Mode Power MOSFET

MTE2D0N06RF3

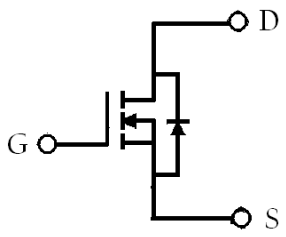
BV_{DSS}	**60V**
I_D@V_{GS}=10V, T_C=25°C	**170A**
I_D@V_{GS}=10V, T_A=25°C	**18.5A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=50A	**2.8mΩ(typ)**

Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- RoHS compliant package

Symbol

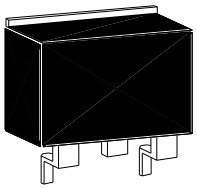
MTE2D0N06RF3



G：Gate D：Drain S：Source

Outline

TO-263



G D S

Ordering Information

Device	Package	Shipping
MTE2D0N06RF3-0-T7-X	TO-263 (Pb-free lead plating and RoHS compliant package)	800 pcs / Tape & Reel

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

Packing spec, T7 : 800 pcs / tape & reel, 13” reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (T_C=25°C)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage (Note 1)		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ T_C=25°C, V_{GS}=10V (Note 1)		I_D	170	A
Continuous Drain Current @ T_C=100°C, V_{GS}=10V (Note 1)			120	
Continuous Drain Current @T_A=25°C, V_{GS}=10V (Note 2)		I_{DSM}	18.5	
Continuous Drain Current @T_A=70°C, V_{GS}=10V (Note 2)			14.8	
Pulsed Drain Current @ V_{GS}=10V		I_{DM}	578	
Avalanche Current @L=0.1mH		I_{AS}	100	
Single Pulse Avalanche Energy @ L=1mH, I_D=50 Amps, V_{DD}=25V (Note 4)		E_{AS}	1250	mJ
Repetitive Avalanche Energy (Note 3)		E_{AR}	16	
Power Dissipation	T_C=25°C (Note 1)	P_D	163	W
	T_C=100°C (Note 1)		81.5	
	T_A=25°C (Note 2)	P_{DSM}	2	
	T_A=70°C (Note 2)		1.3	
Maximum Temperature for Soldering @ Lead at 0.063 in(1.6mm) from case for 10 seconds		T_L	300	°C
Maximum Temperature for Soldering @ Package Body for 10 seconds		T_{PKG}	260	
Operating Junction and Storage Temperature		Tj, Tstg	-55~+175	

*Drain current limited by maximum junction temperature

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	0.92	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	$R_{\theta JA}$	62.5	

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 in^2 FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_{DSM} 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. 100% tested by condition of V_{DD}=25V, I_D=25A, L=1mH, V_{GS}=15V.

5. The static characteristics are obtained using <300μs pulses, duty cycle 0.5% maximum.

6. The $R_{\theta JA}$ is the sum of thermal resistance from junction to case $R_{\theta JC}$ and case to ambient.

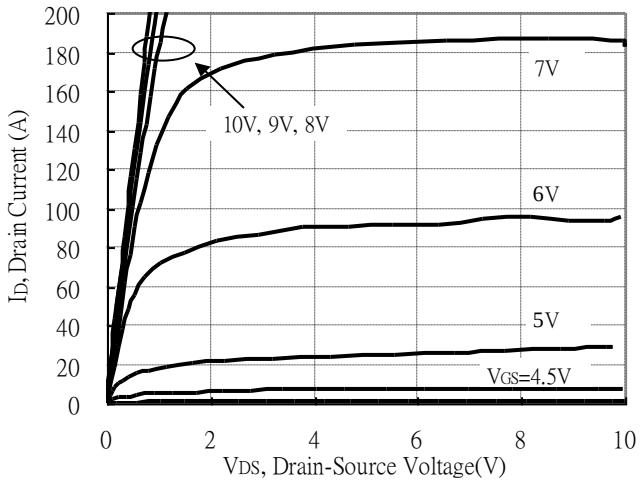
Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	34	-	mV/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2	-	4	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	24.2	-	S	V_{DS} =10V, I_D=20A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =48V, V_{GS} =0V
	-	-	25		V_{DS} =48V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	2.8	3.4	mΩ	V_{GS} =10V, I_D=50A
Dynamic					
*Qg	-	124	-	nC	V_{DD}=48V, I_D=50A,V_{GS}=10V
*Qgs	-	41	-		
*Qgd	-	35.9	-		
*$t_{d(ON)}$	-	48.4	-	ns	V_{DD}=30V, I_D=50A, V_{GS}=10V, R_G=1Ω
*tr	-	40.6	-		
*$t_{d(OFF)}$	-	77.6	-		
*t_f	-	27.8	-		
Ciss	-	7289	-	pF	V_{GS}=0V, V_{DS}=30V, f=1MHz
Coss	-	1179	-		
Crss	-	151	-		
Rg	-	1.4	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	75	A	
*I_{SM}	-	-	578		
*V_{SD}	-	0.83	1.2	V	I_S=30A, V_{GS}=0V
*trr	-	42.3	-	ns	V_{GS}=0V, I_F=30A, dI_F/dt=100A/μs
*Qrr	-	43.3	-	nC	

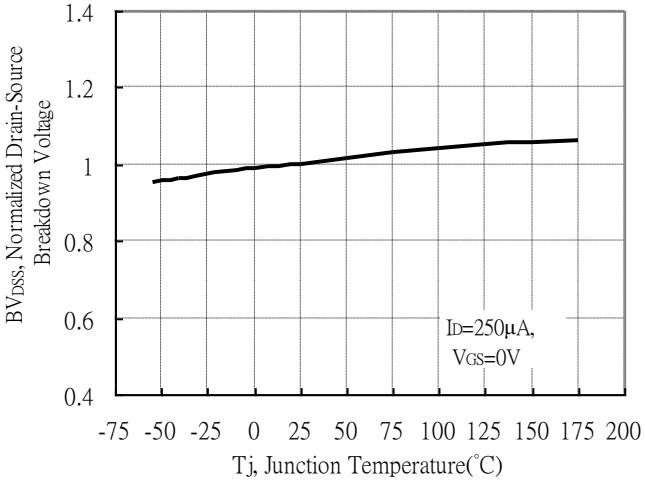
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Typical Characteristics

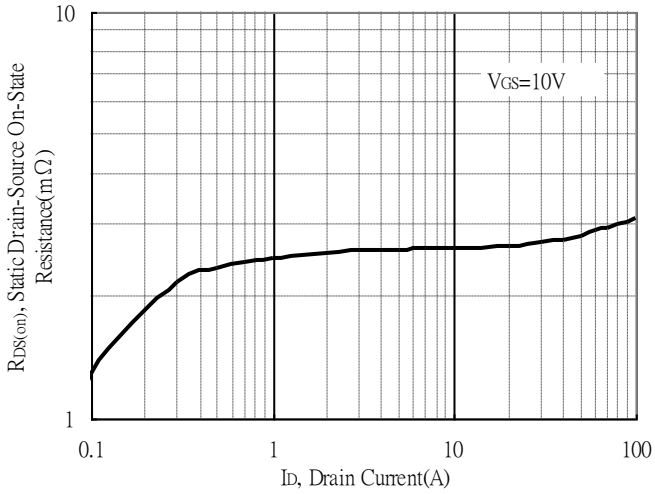
Typical Output Characteristics



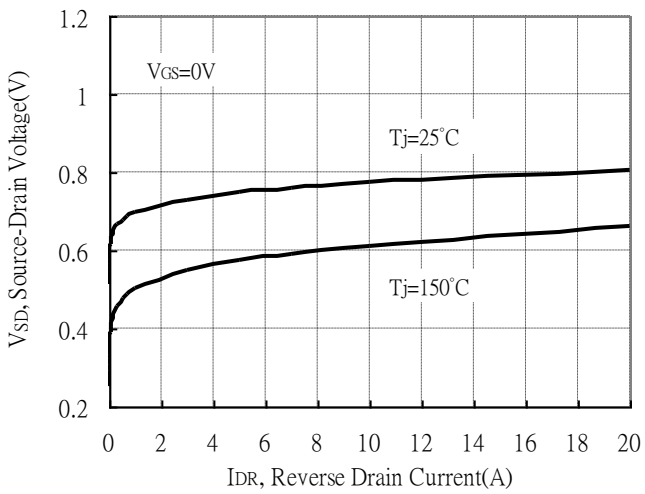
Brekdown Voltage vs Ambient Temperature



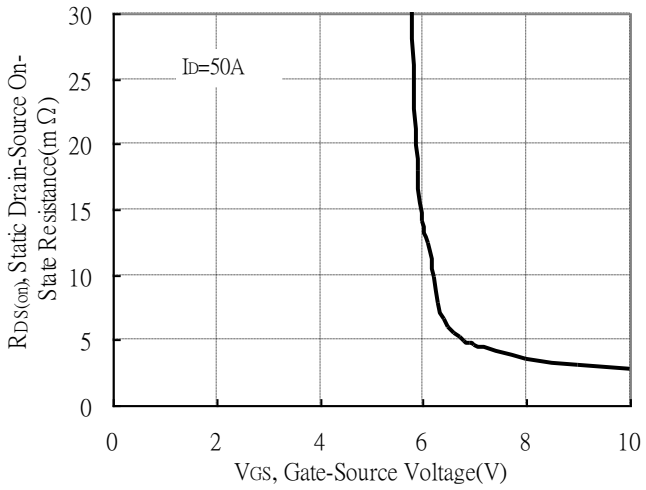
Static Drain-Source On-State resistance vs Drain Current



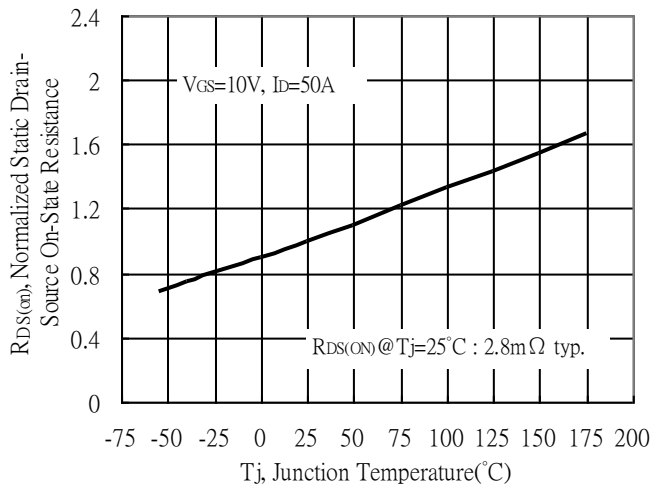
Reverse Drain Current vs Source-Drain Voltage



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

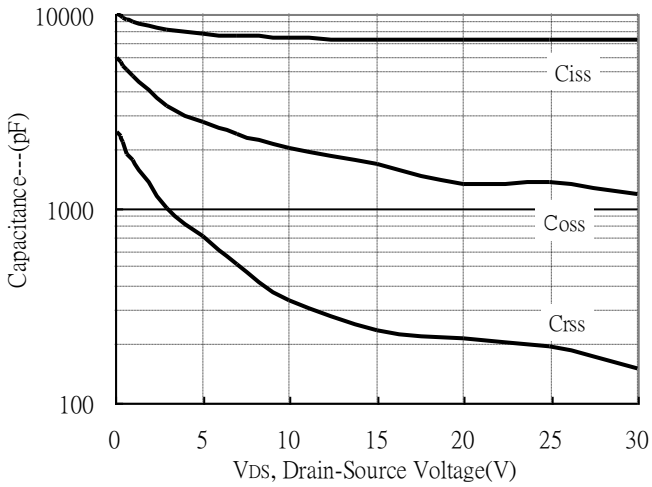


Drain-Source On-State Resistance vs Junction Tempearture

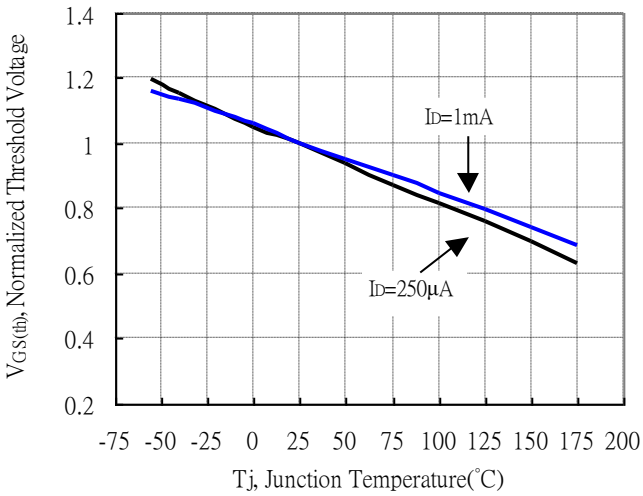


Typical Characteristics(Cont.)

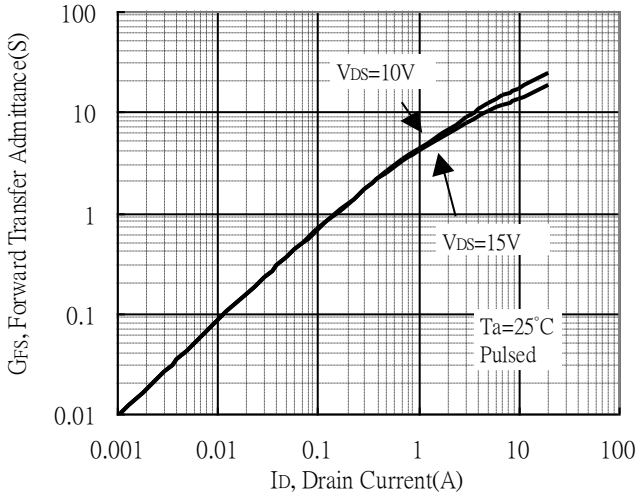
Capacitance vs Drain-to-Source Voltage



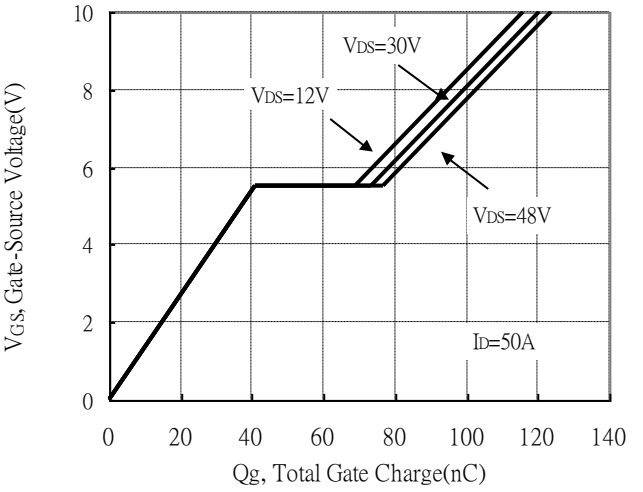
Threshold Voltage vs Junction Tempearture



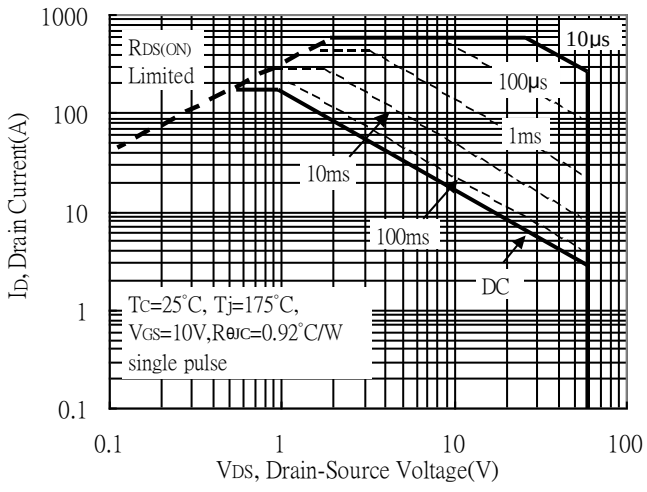
Forward Transfer Admittance vs Drain Current



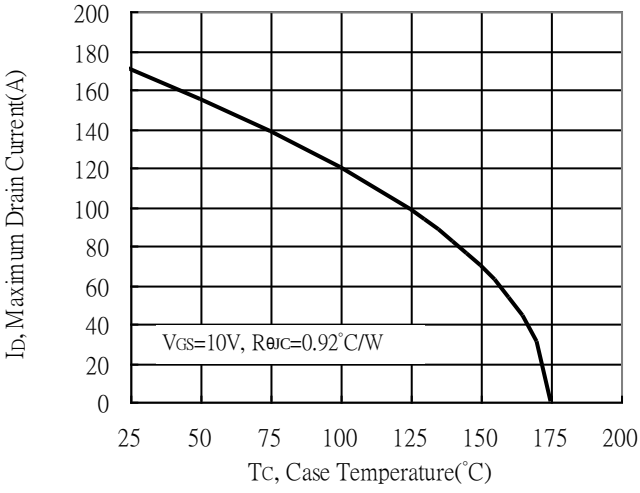
Gate Charge Characteristics



Maximum Safe Operating Area

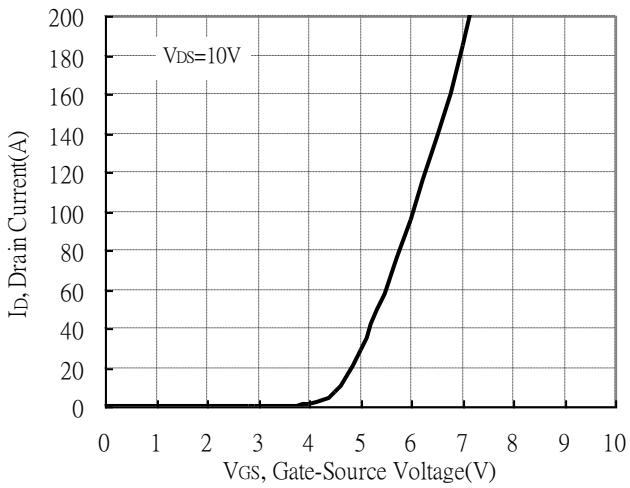


Maximum Drain Current vs Case Temperature

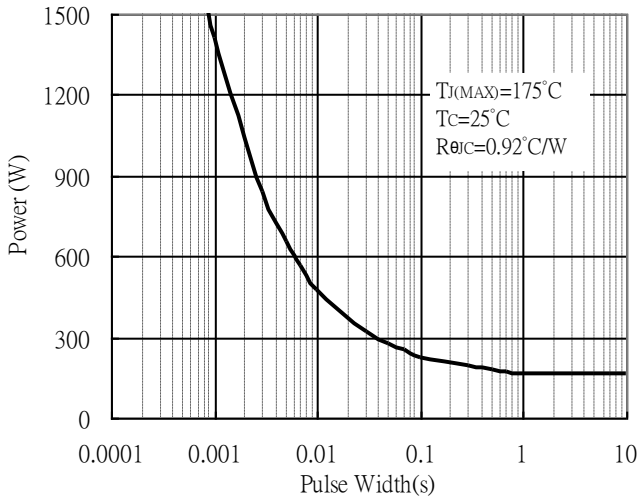


Typical Characteristics(Cont.)

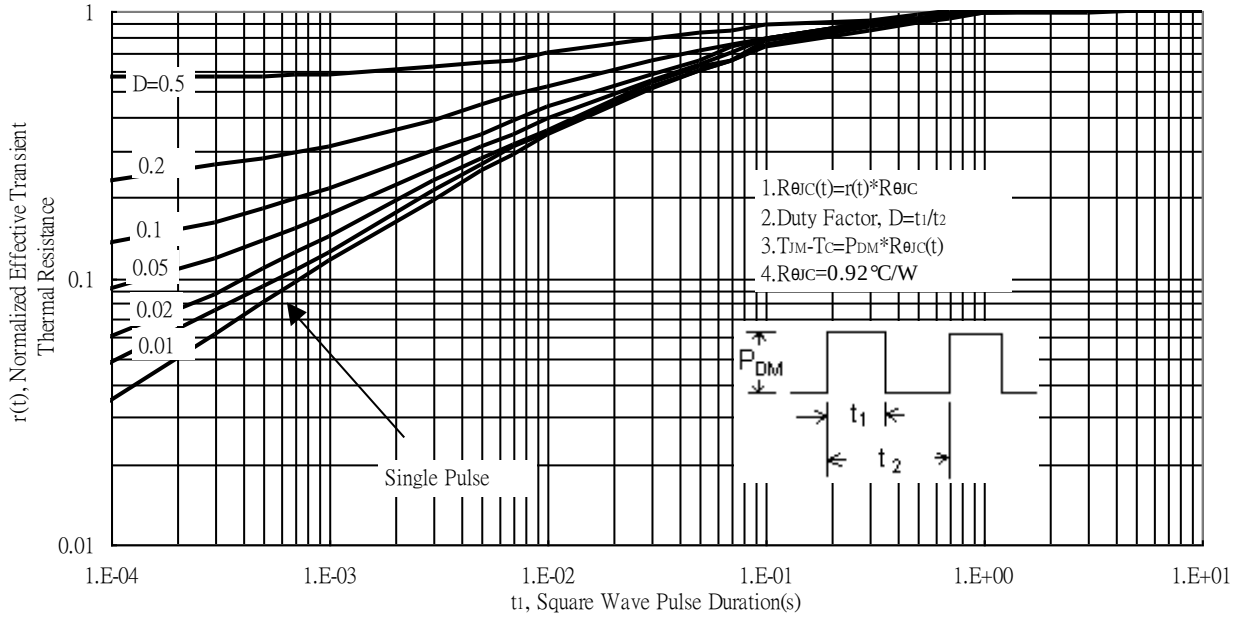
Typical Transfer Characteristics



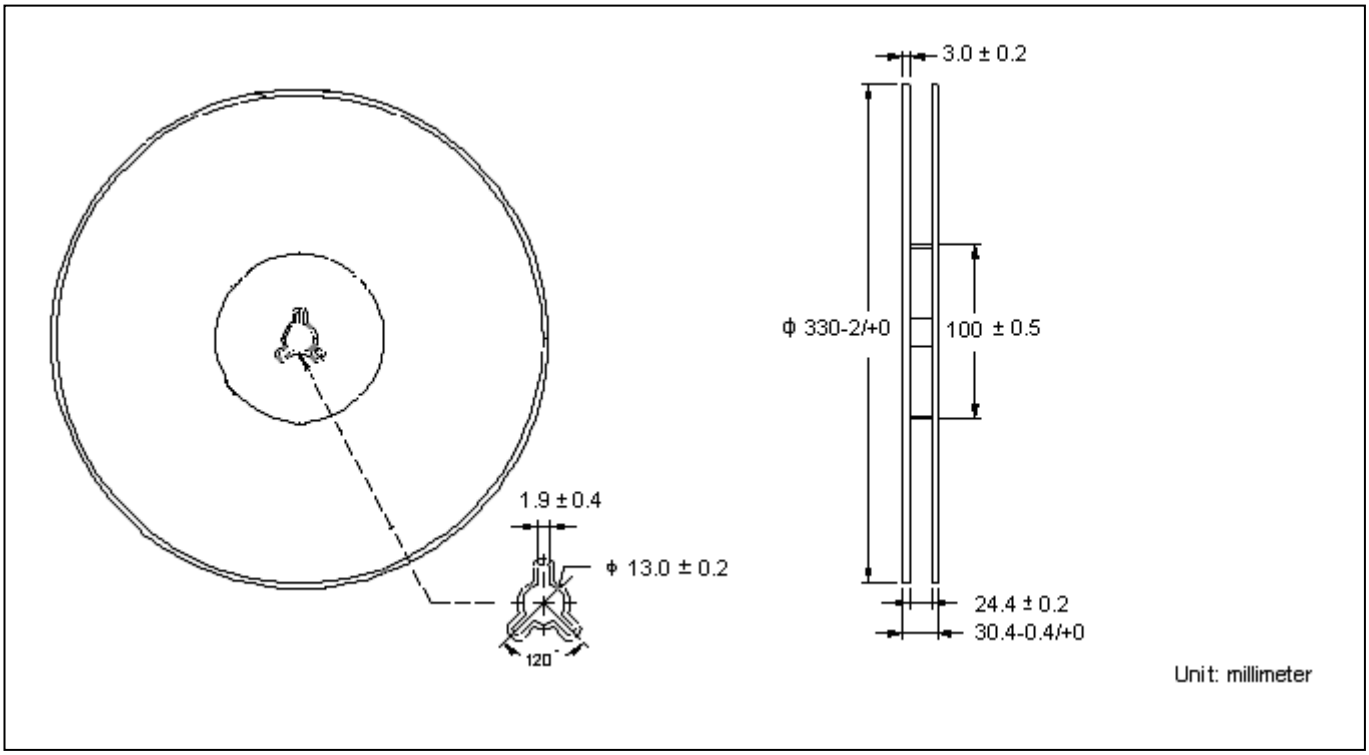
Single Pulse Power Rating, Junction to Case



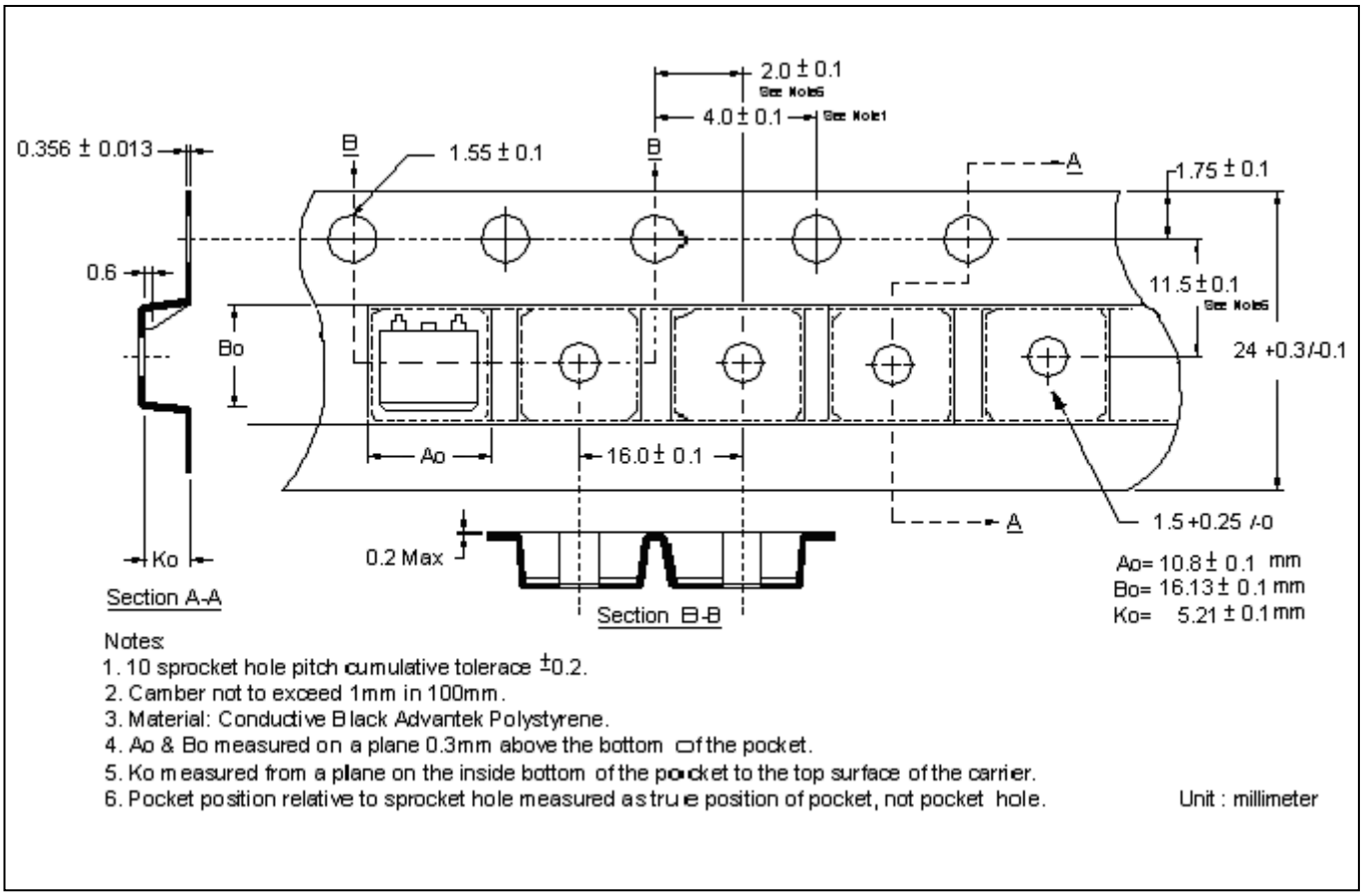
Transient Thermal Response Curves



Reel Dimension



Carrier Tape Dimension



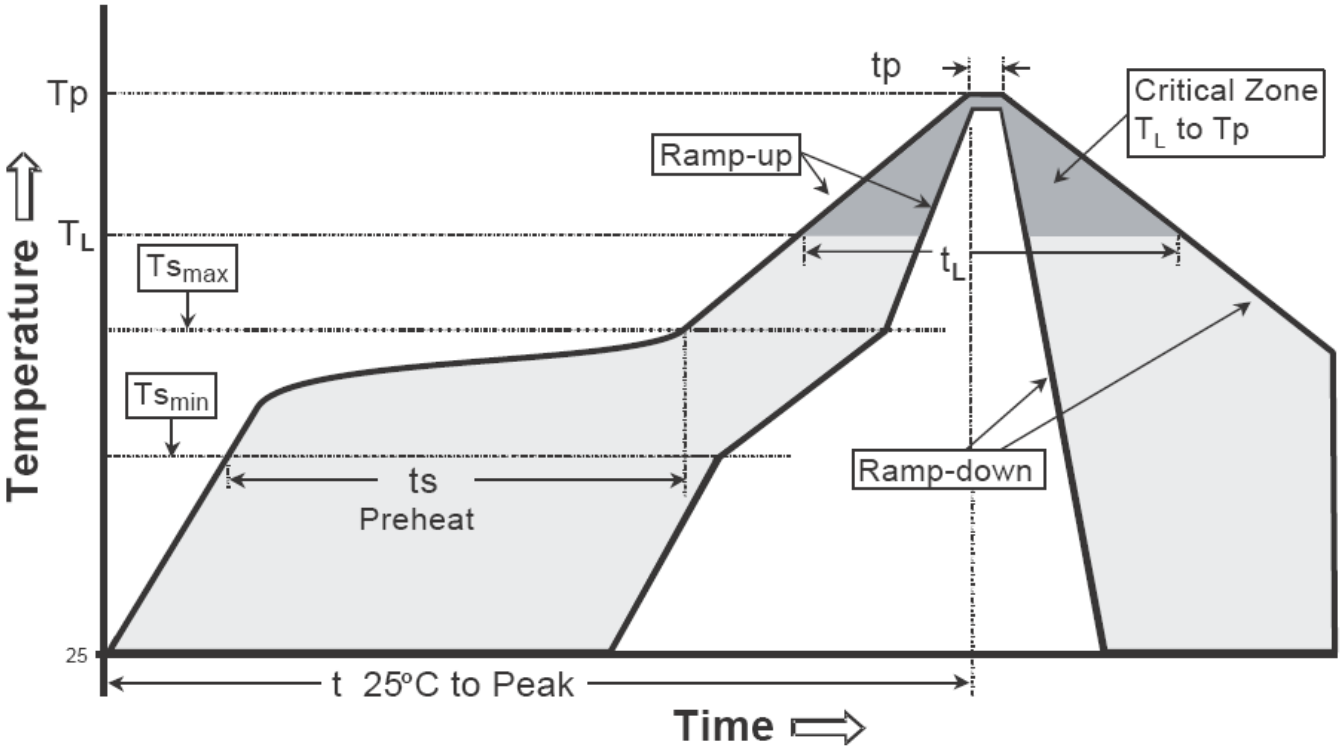
Notes:
1. 10 sprocket hole pitch cumulative tolerace ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: Conductive Black Advantek Polystyrene.
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Unit : millimeter

Recommended wave soldering condition

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

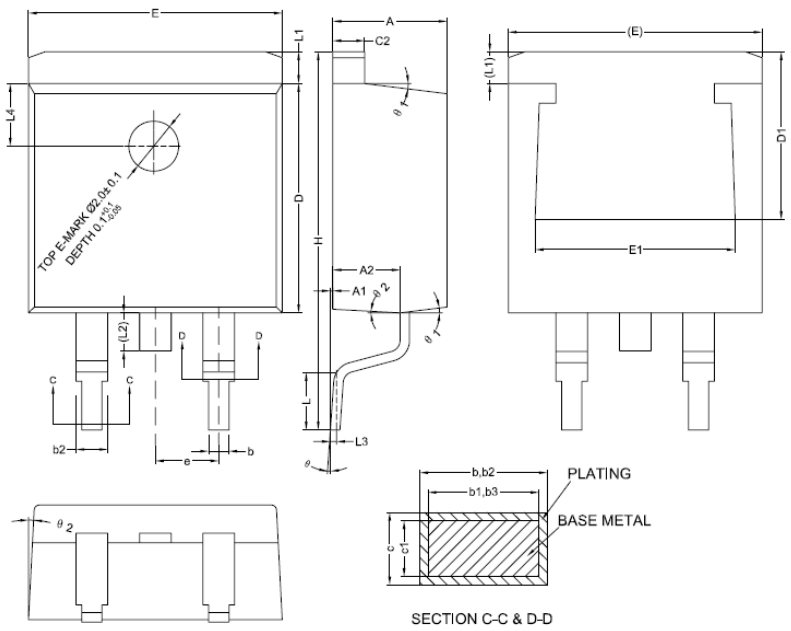
Recommended temperature profile for IR reflow



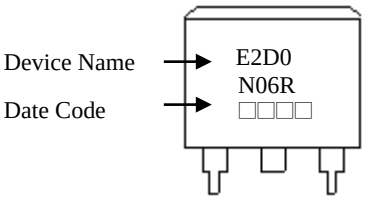
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (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-263 Dimension



Marking :



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

3-Lead Plastic Surface Mounted Package
CYStek Package Code : F3

Date Code : (From left to right)
First Code : Year code, the last digit of Christinr year. For example, 2014→4, 2015→, 2016→6, …, etc.
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
Third and fourth codes : production serial number, 01~99

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.40	4.70	0.173	0.185	E	10.06	10.26	0.396	0.404
A1	0.00	0.25	0.000	0.010	E1	7.80	8.20	0.307	0.323
A2	2.59	2.79	0.102	0.110	e	2.54 BSC		0.100 BSC	
b	0.77	0.90	0.030	0.035	H	14.70	15.50	0.579	0.610
b1	0.76	0.86	0.030	0.034	L	2.00	2.60	0.079	0.102
b2	1.23	1.36	0.048	0.054	L1	1.17	1.40	0.046	0.055
b3	1.22	1.32	0.048	0.052	L2	-	1.75	-	0.069
c	0.34	0.47	0.013	0.019	L3	0.25 BSC		0.010 BSC	
c1	0.33	0.43	0.013	0.017	L4	2.00 REF		0.079 BSC	
c2	1.22	1.32	0.048	0.052	θ	0°	8°	0°	8°
D	9.05	9.25	0.356	0.364	Θ1	5°	9°	5°	9°
D1	6.60	-	0.260	-	Θ2	1°	5°	1°	5°

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.