

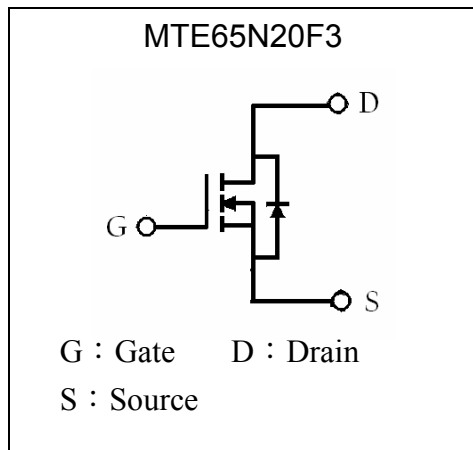
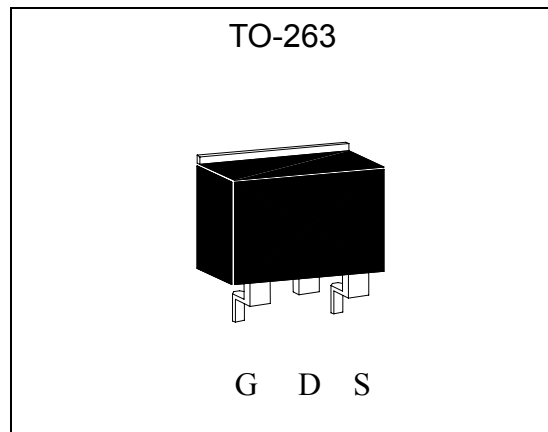
N-Channel Enhancement Mode Power MOSFET

MTE65N20F3

BV_{DSS}		200V
I_D		33A
$R_{DSON(TYP)}$	$V_{GS}=10V, I_D=11A$	61m Ω
	$V_{GS}=6V, I_D=5A$	66m Ω

Features

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

Equivalent Circuit

Outline

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Limits	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current @ $T_C=25^\circ\text{C}, V_{GS}=10V$	I_D	33	A
Continuous Drain Current @ $T_C=100^\circ\text{C}, V_{GS}=10V$	I_D	23	
Pulsed Drain Current *1	I_{DM}	70	
Avalanche Current	I_{AS}	20	mJ
Avalanche Energy @ $L=1.6mH, I_D=20A, R_G=25\Omega$	E_{AS}	320	
Repetitive Avalanche Energy @ $L=0.1mH$ (Note 2)	E_{AR}	4.6	W
Total Power Dissipation @ $T_C=25^\circ\text{C}$	Pd	168	
Total Power Dissipation @ $T_A=25^\circ\text{C}$		3.75	
Operating Junction and Storage Temperature Range	T_j, T_{stg}	-55~+175	$^\circ\text{C}$

Note : *1. Pulse width limited by maximum junction temperature

 *2. Duty cycle $\leq 1\%$



Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	0.89	°C/W
Thermal Resistance, Junction-to-ambient, max*	$R_{th,j-a}$	40	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	62.5	°C/W

*When mounted on the minimum pad size (PCB mount).

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	200	-	-	V	$V_{GS}=0, I_D=250\mu A$
$V_{GS(th)}$	2.5	3.8	4.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
I_{GSS}	-	-	±100	nA	$V_{GS}=\pm 20, V_{DS}=0$
I_{DSS}	-	-	1	μA	$V_{DS}=180V, V_{GS}=0$
	-	-	25		$V_{DS}=180V, V_{GS}=0, T_J=125^\circ C$
$R_{DS(ON)} *1$	-	61	80	$m\Omega$	$V_{GS}=10V, I_D=11A$
	-	66	100		$V_{GS}=6V, I_D=5A$
$G_{FS} *1$	-	15	-	S	$V_{DS}=15V, I_D=11A$
Dynamic					
$Q_g *1, 2$	-	60	-	nC	$V_{DS}=160V, I_D=25A, V_{GS}=10V$
$Q_{gs} *1, 2$	-	12.1	-		
$Q_{gd} *1, 2$	-	24.2	-		
$t_{d(ON)} *1, 2$	-	62	-	ns	$V_{DS}=100V, I_D=20A, V_{GS}=10V, R_G=25\Omega$
$t_r *1, 2$	-	62	-		
$t_{d(OFF)} *1, 2$	-	200	-		
$t_f *1, 2$	-	100	-		
C_{iss}	-	2447	-	pF	$V_{GS}=0V, V_{DS}=25V, f=1MHz$
C_{oss}	-	180	-		
C_{rss}	-	102	-		
Source-Drain Diode					
$I_S *1$	-	-	20	A	
$I_{SM} *3$	-	-	40		
$V_{SD} *1$	-	0.82	1.3	V	$I_F=I_S, V_{GS}=0V$
t_{rr}	-	120	-	ns	$I_F=20A, dI_F/dt=100A/\mu s$
Q_{rr}	-	400	-	nC	

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

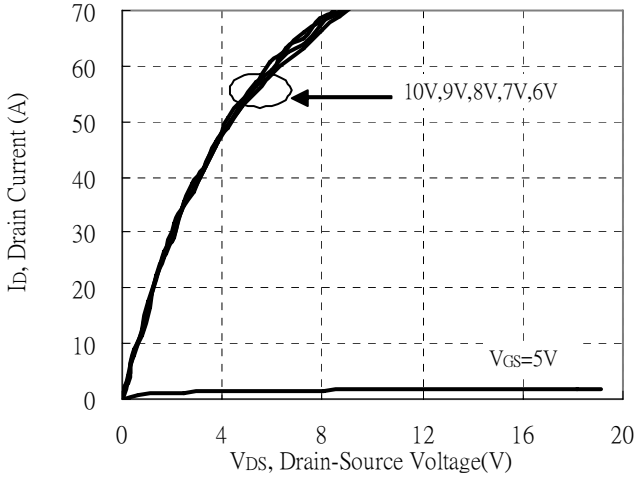
Ordering Information

Device	Package	Shipping
MTE65N20F3-0-T4-S	TO-252 (Pb-free lead plating and RoHS compliant package)	800 pcs / Tape & Reel

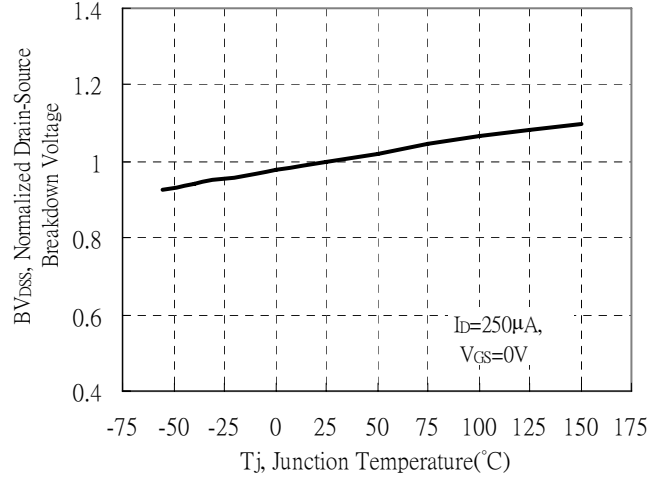


Typical Characteristics

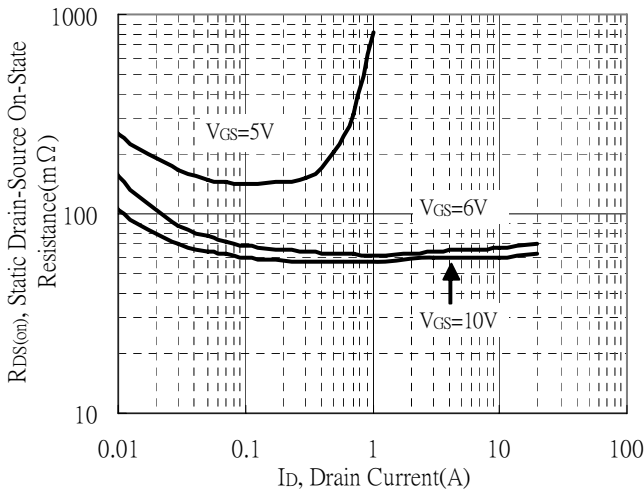
Typical Output Characteristics



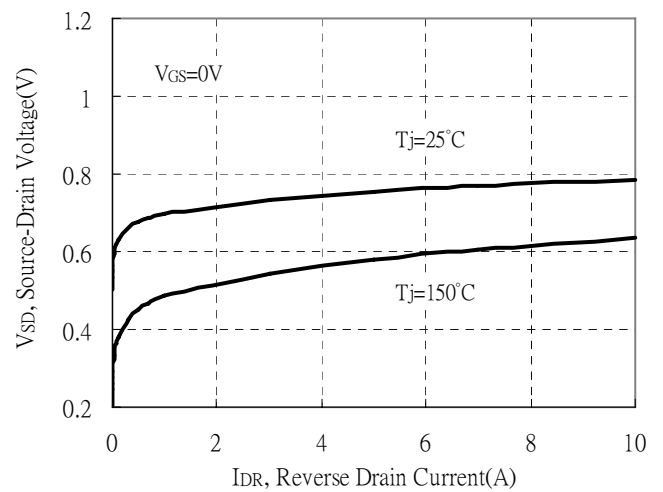
Brekdown Voltage vs Ambient Temperature



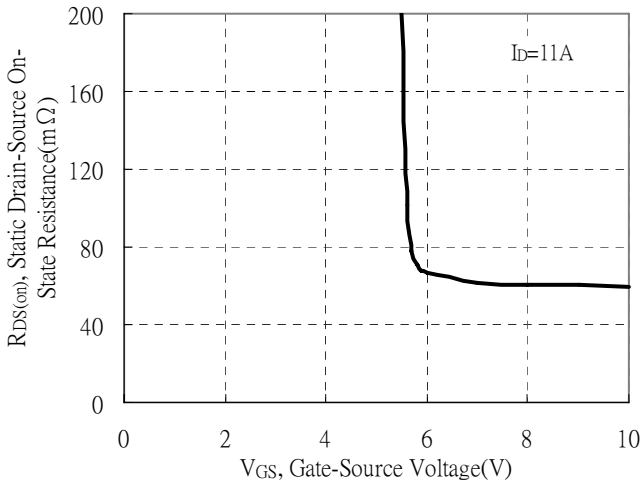
Static Drain-Source On-State resistance vs Drain Current



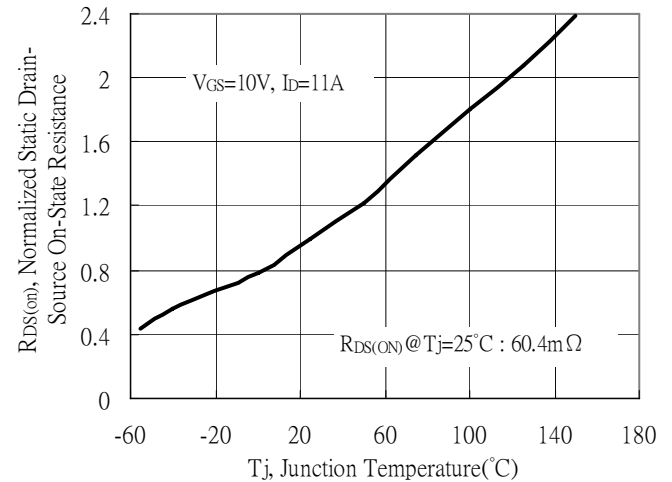
Reverse Drain Current vs Source-Drain Voltage



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



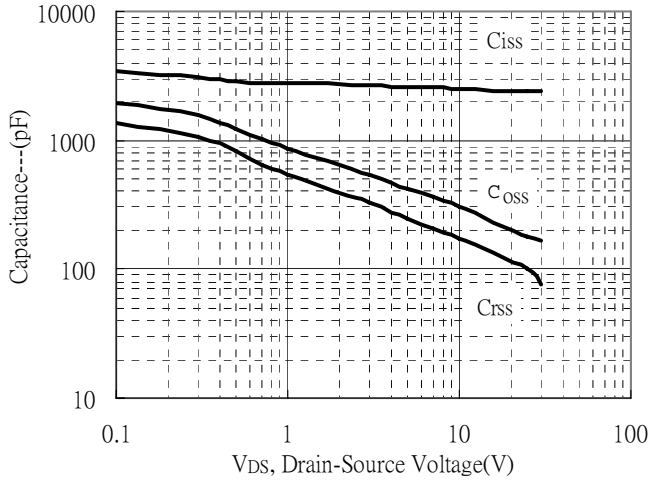
Drain-Source On-State Resistance vs Junction Temperature



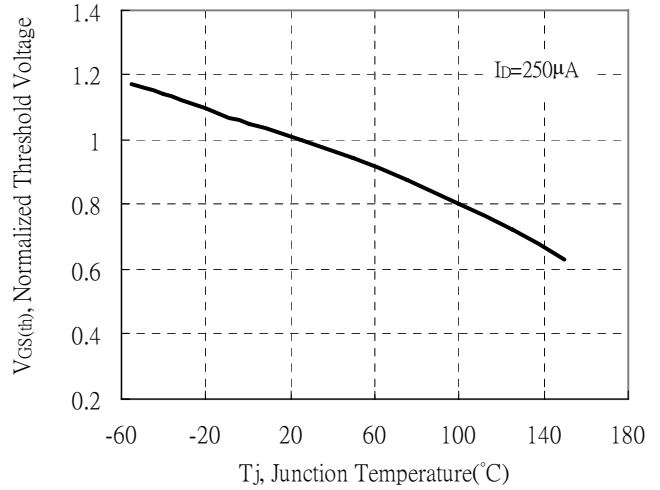


Typical Characteristics(Cont.)

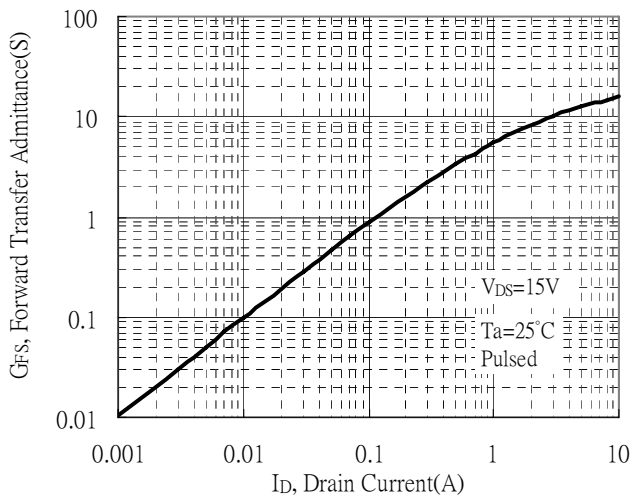
Capacitance vs Drain-to-Source Voltage



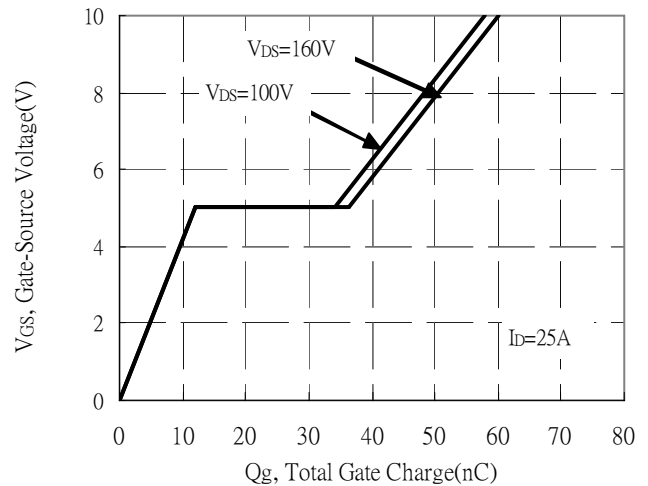
Threshold Voltage vs Junction Temperature



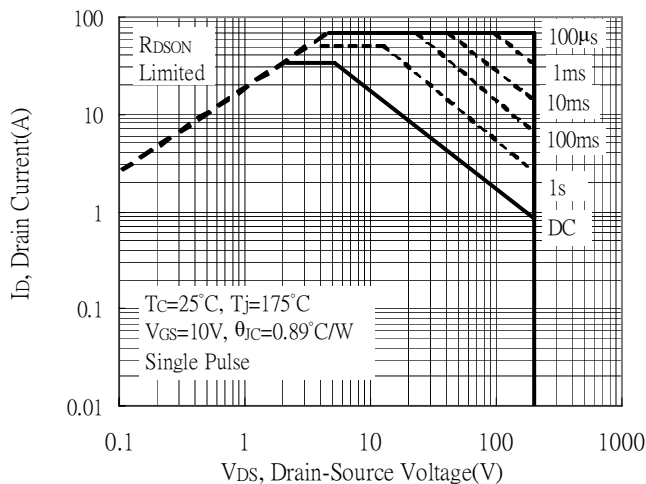
Forward Transfer Admittance vs Drain Current



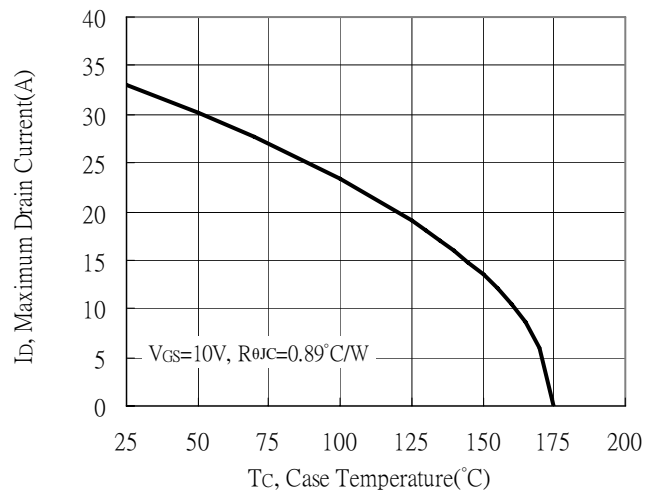
Gate Charge Characteristics



Maximum Safe Operating Area



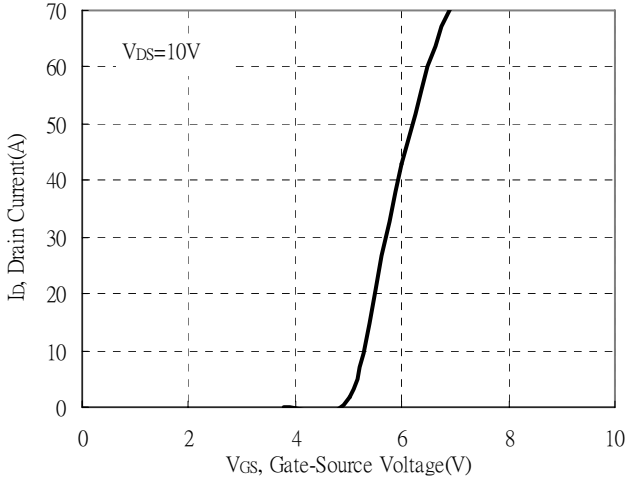
Maximum Drain Current vs Case Temperature



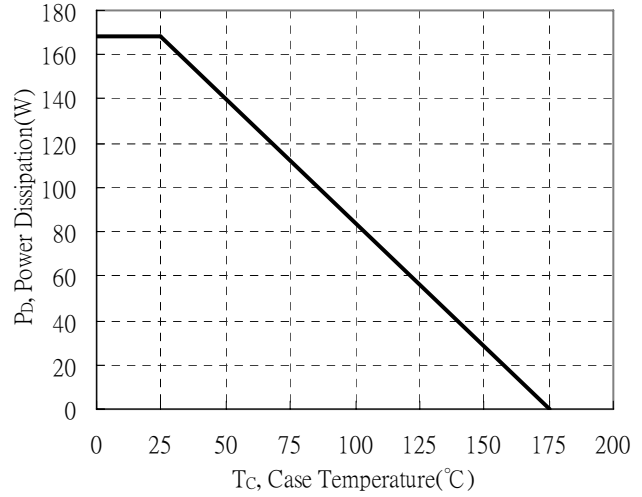


Typical Characteristics(Cont.)

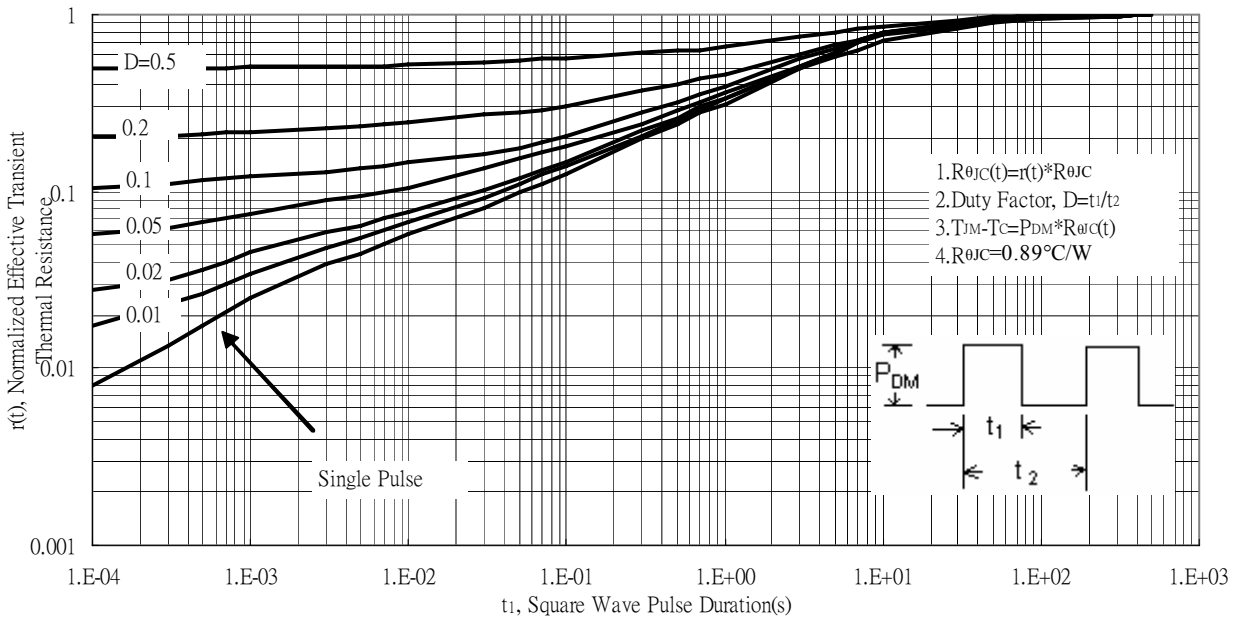
Typical Transfer Characteristics



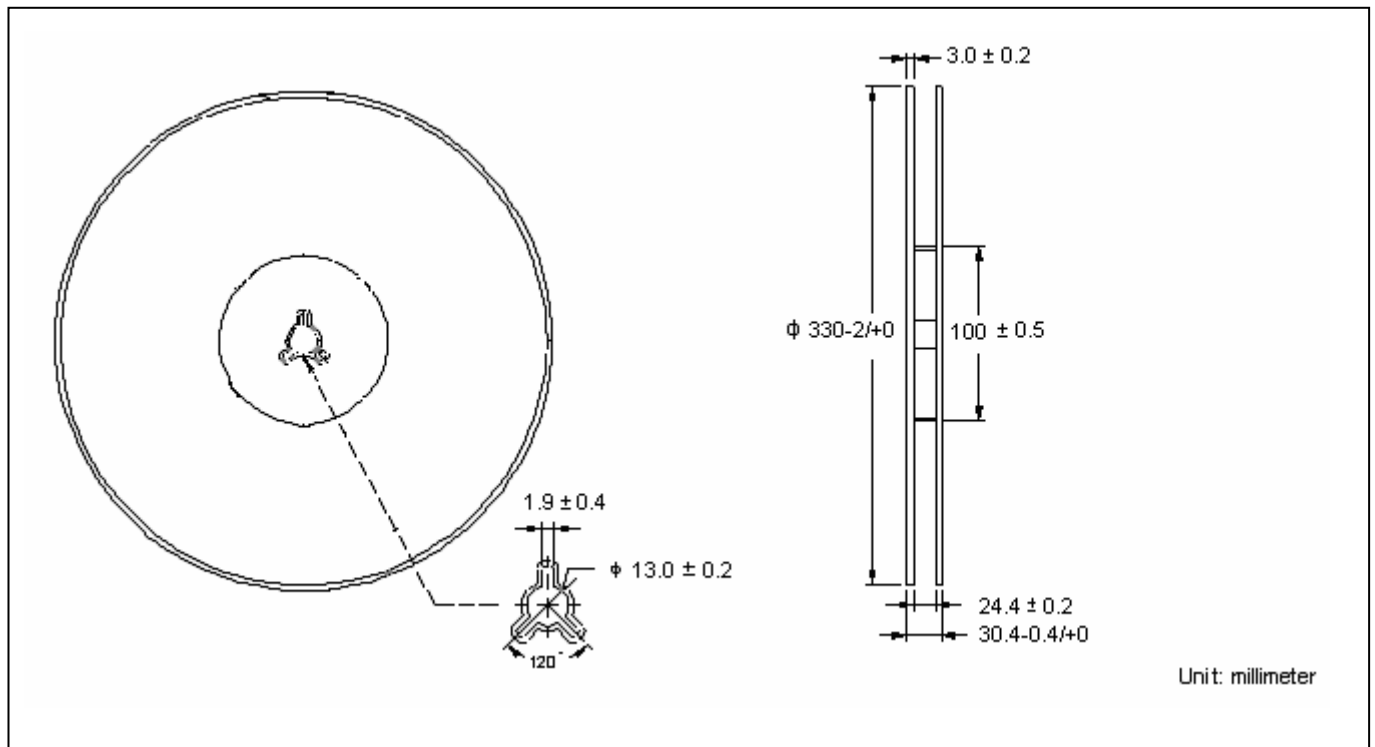
Power Derating Curve



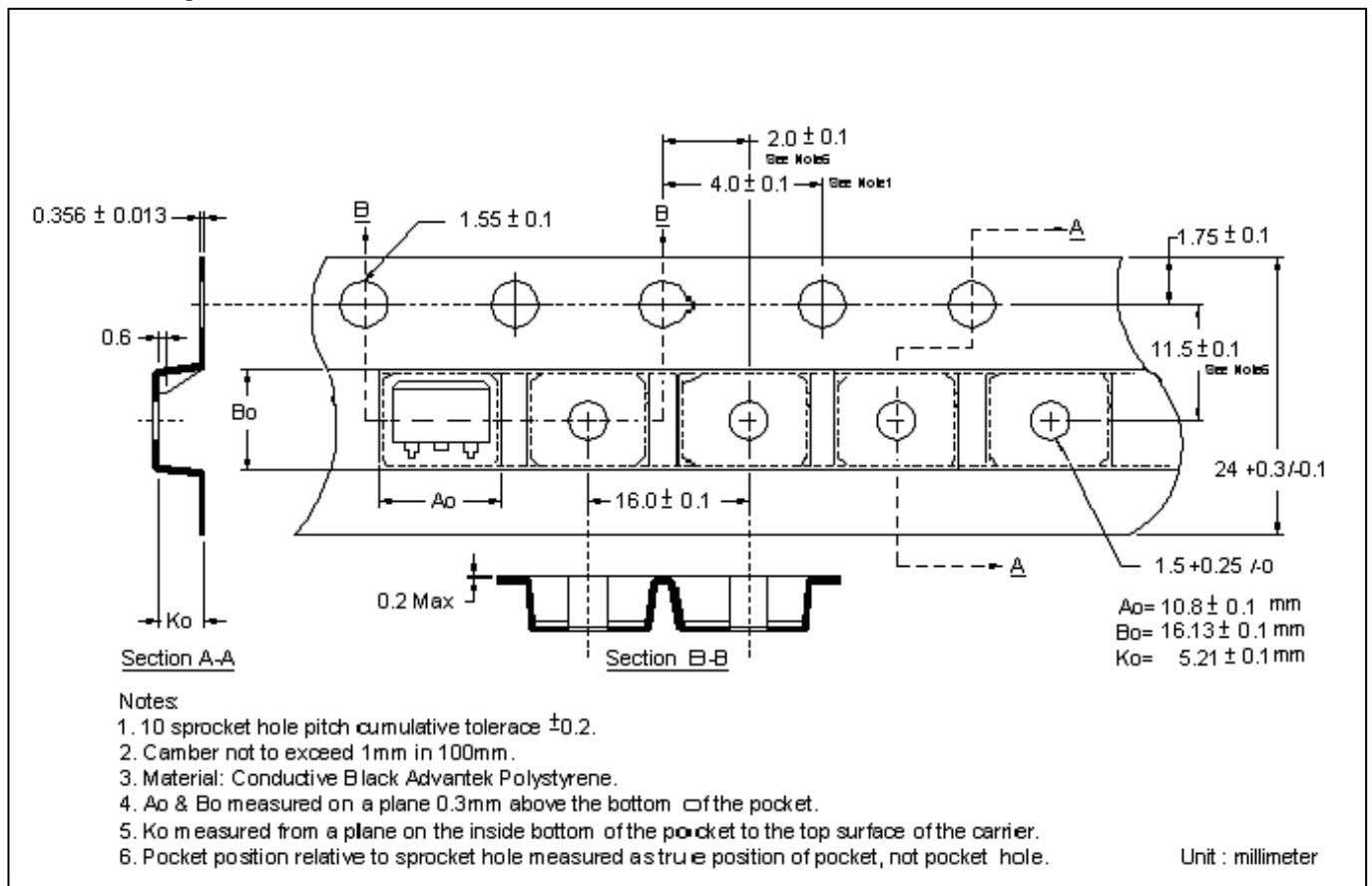
Transient Thermal Response Curves



Reel Dimension



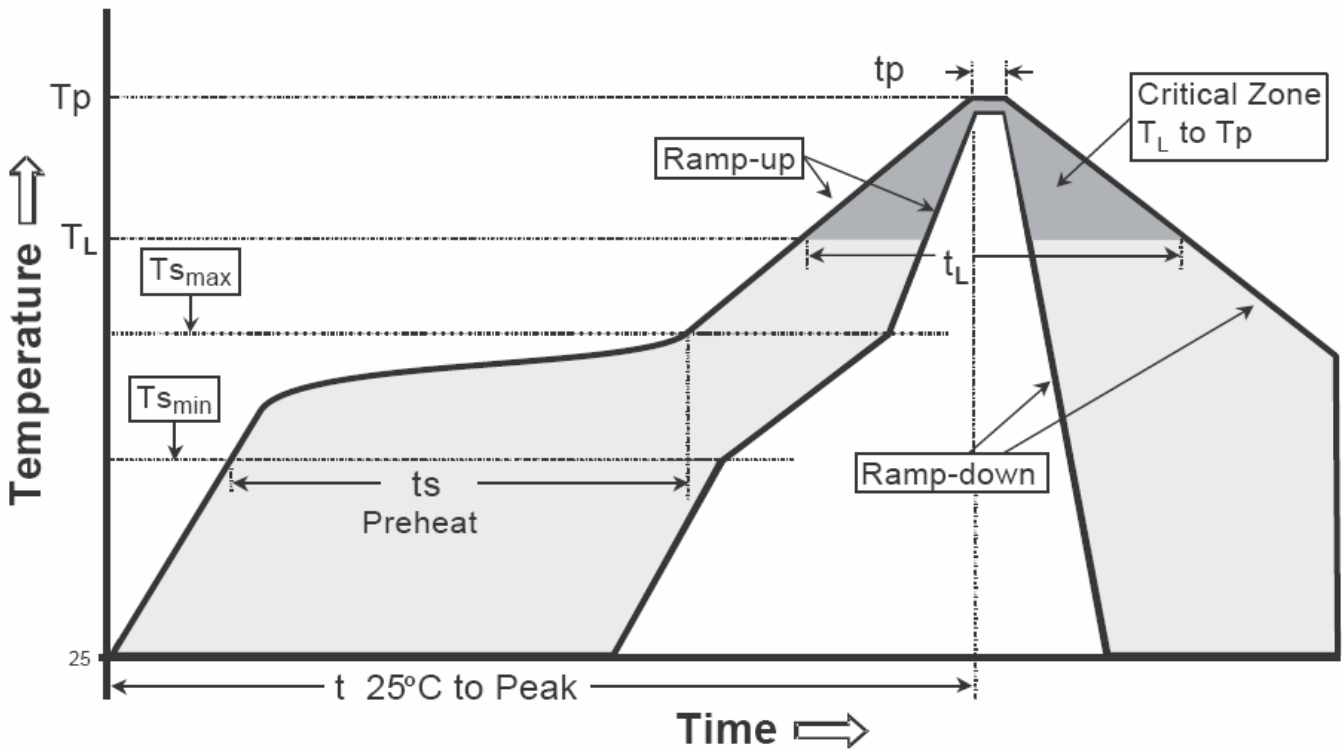
Carrier Tape Dimension



Recommended wave soldering condition

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

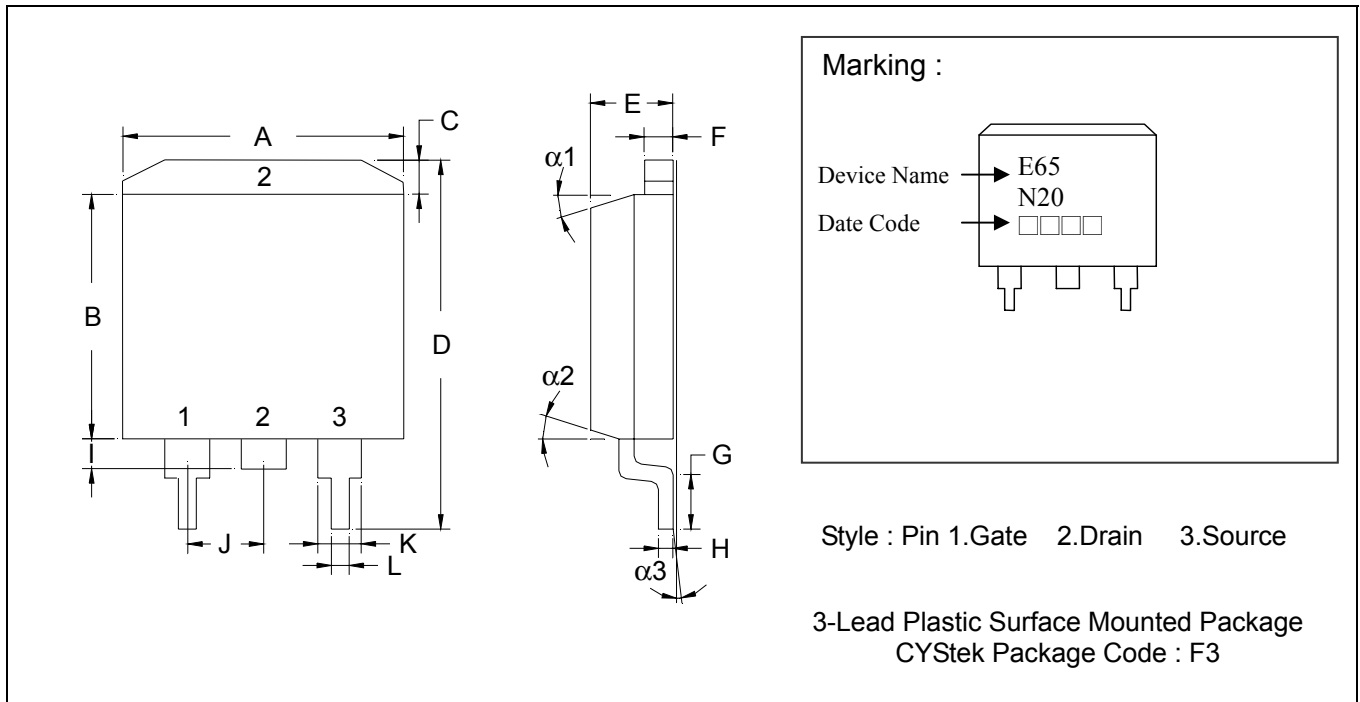
Recommended temperature profile for IR reflow



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(Ts min)	100°C	150°C
-Temperature Max(Ts max)	150°C	200°C
-Time(ts min to ts max)	60-120 seconds	60-180 seconds
Time maintained above:		
-Temperature (Tl)	183°C	217°C
- Time (tl)	60-150 seconds	60-150 seconds
Peak Temperature(Tp)	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



*:Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.3800	0.4050	9.65	10.29	I	0.0500	0.0700	1.27	1.78
B	0.3300	0.3700	8.38	9.40	J	-	*0.1000	-	*2.54
C	-	0.0550	-	1.40	K	0.0450	0.0550	1.14	1.40
D	0.5750	0.6250	14.61	15.88	L	0.0200	0.0390	0.51	0.99
E	0.1600	0.1900	4.06	4.83	$\alpha 1$	-	-	6°	8°
F	0.0450	0.0550	1.14	1.40	$\alpha 2$	-	-	6°	8°
G	0.0900	0.1100	2.29	2.79	$\alpha 3$	-	-	0°	5°
H	0.0180	0.0290	0.46	0.74					

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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