P-Channel Enhancement Mode Power MOSFET

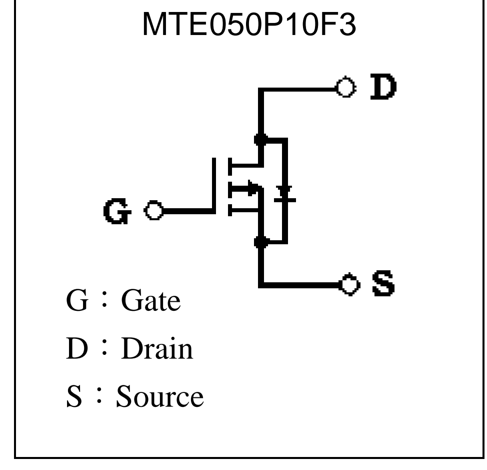
MTE050P10F3

BV_{DSS}	-100V
I_D @ V_{GS}=-10V, T_C=25°C	-44A
I_D @ V_{GS}=-10V, T_A=25°C	-4.6A
$R_{DSON(TYP)}$ @ V_{GS}=-10V, I_D=-20A	40mΩ

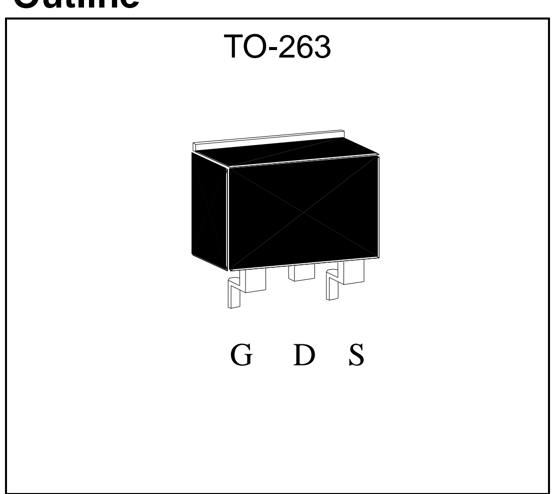
Features

- Low Gate Charge
- Simple Drive Requirement
- Repetitive Avalanche Rated
- Fast Switching Characteristic
- RoHS compliant package

Symbol



Outline



Ordering Information

Device	Package	Shipping
MTE050P10F3-0-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, unless otherwise noted)

Parameter			Symbol	Limits	Unit
Drain-Source Voltage			V_{DS}	-100	V
Gate-Source Voltage			V_{GS}	±25	
Continuous Drain Current @ T_C=25°C, V_{GS}=-10V			I_D	-44	A
Continuous Drain Current @ T_C=100°C, V_{GS}=-10V				-31	
Pulsed Drain Current		(Note 3)	I_{DM}	-140	
Continuous Drain Current @ T_A=25°C , V_{GS}=10V		(Note 2)	I_{DSM}	-4.6	
Continuous Drain Current @ T_A=70°C , V_{GS}=10V		(Note 2)		-3.7	
Avalanche Current		(Note 4)	I_{AS}	-44	
Avalanche Energy @ L=1mH, I_D=-21A, V_{DD}=-25V		(Note 4)	E_{AS}	221	mJ
Repetitive Avalanche Energy@ L=0.1mH		(Note 3)	E_{AR}	20	
Power Dissipation	T_C=25°C	(Note 1)	P_D	200	W
	T_C=100°C	(Note 1)		100	
Power Dissipation	T_A=25°C	(Note 2)	P_{DSM}	2	
	T_A=70°C	(Note 2)		1.3	
Operating Junction and Storage Temperature			Tj, Tstg	-55~+175	°C

Thermal Data

Parameter		Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max		$R_{th,j-c}$	0.75	°C/W
Thermal Resistance, Junction-to-ambient, max	(Note 2)	$R_{th,j-a}$	62	

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.

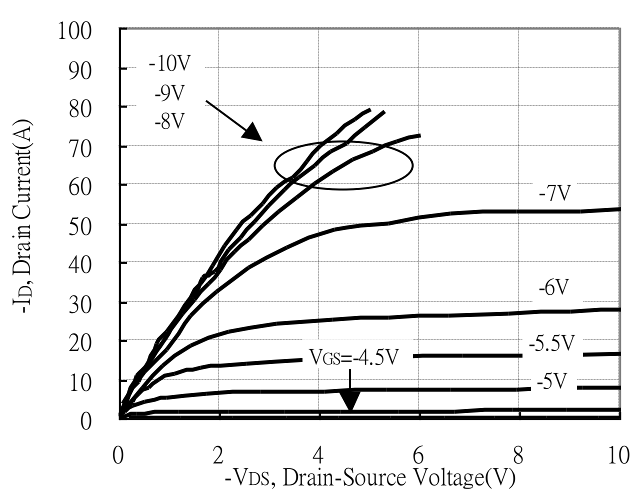
2. The value of $R_{θJA}$ is measured with the device mounted on 1 in^2 FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The power dissipation P_{DSM} is based on $R_{θJA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design, and the maximum temperature of 175°C may be used if the PCB allows it.
3. 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 conditions of L=1mH, I_{AS}=-18A, V_{GS}=-10V, V_{DD}=-25V.
5. The static characteristics are obtained using <300μs pulses, duty cycle 0.5% maximum.
6. The $R_{θJA}$ is the sum of thermal resistance from junction to case $R_{θJC}$ and case to ambient.

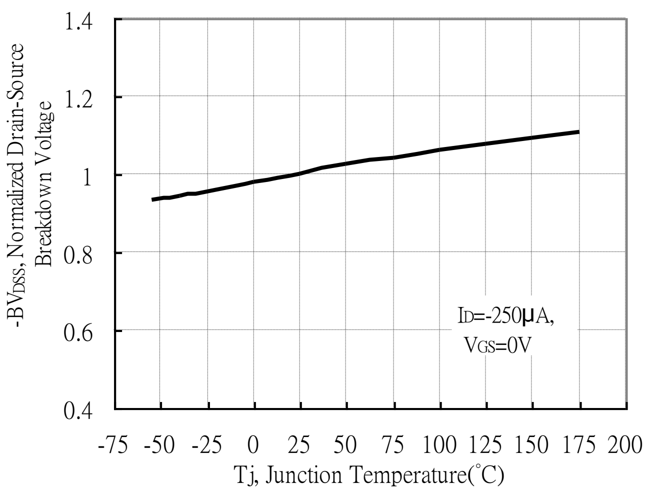
Characteristics (T_C=25°C, unless otherwise specified)

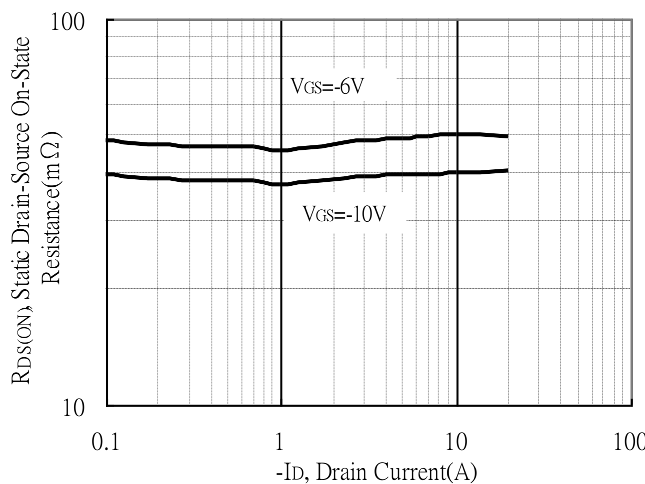
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-100	-	-	V	V_{GS}=0V, I_D=-250μA
$V_{GS(th)}$	-2	-	-4	V	V_{DS} = V_{GS}, I_D=-250μA
G_{FS}	-	23	-	S	V_{DS} =-10V, I_D=-20A
I_{GSS}	-	-	±100	nA	V_{GS}=±25V, V_{DS}=0V
I_{DSS}	-	-	-1	μA	V_{DS} =-80V, V_{GS} =0V
	-	-	-25	μA	V_{DS} =-80V, V_{GS} =0V, Tj=125°C
*$R_{DS(ON)}$	-	40	50	mΩ	V_{GS} =-10V, I_D=-20A
Dynamic					
*Qg	-	33.5	-	nC	I_D=-21A, V_{DS}=-50V, V_{GS}=-10V
*Qgs	-	7.6	-	nC	
*Qgd	-	11.5	-	nC	
*$t_{d(ON)}$	-	20.6	-	ns	V_{DS}=-20V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
*tr	-	18	-	ns	
*$t_{d(OFF)}$	-	73.2	-	ns	
*t_f	-	64.2	-	ns	
Ciss	-	1895	-	pF	V_{GS}=0V, V_{DS}=-25V, f=1MHz
Coss	-	207	-	pF	
Crss	-	94	-	pF	
Rg	-	4.7	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	-44	A	
*I_{SM}	-	-	-140	A	
*V_{SD}	-	-0.85	-1.2	V	I_S=-20A, V_{GS}=0V
*trr	-	30	-	ns	I_F=-20A, V_{GS}=0V, dI_F/dt=100A/μs
*Qrr	-	43	-	nC	

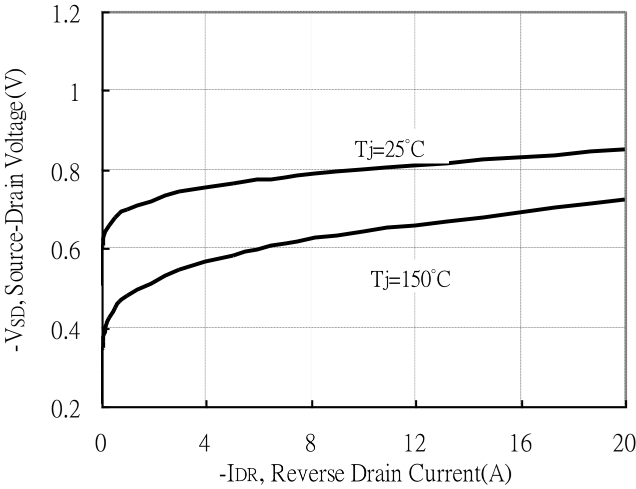
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

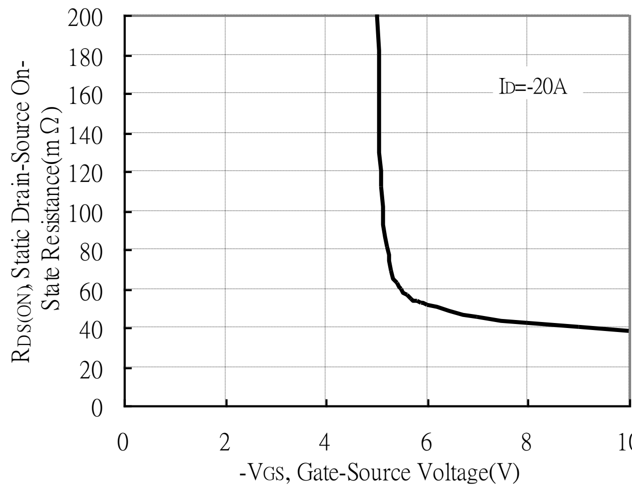
Typical Characteristics

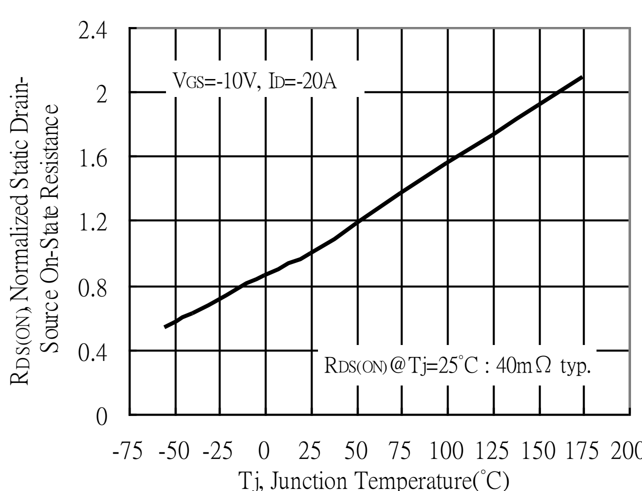












Typical Characteristics(Cont.)

Capacitance vs Drain-to-Source Voltage

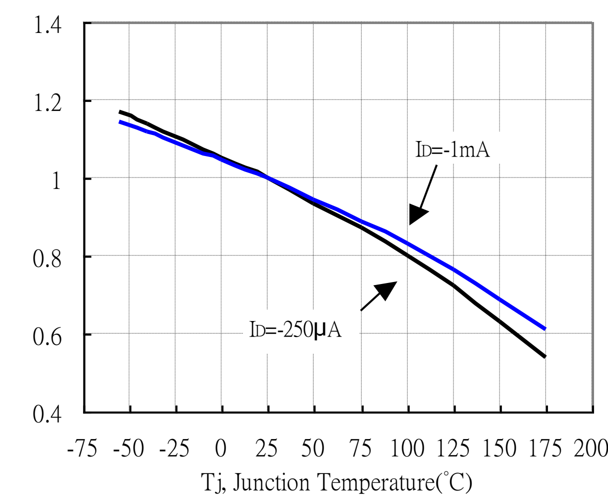
Capacitance---(pF)

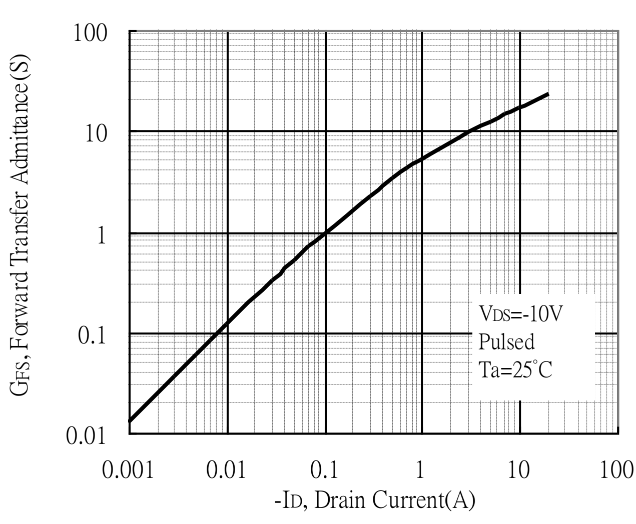
10000
1000
100
10

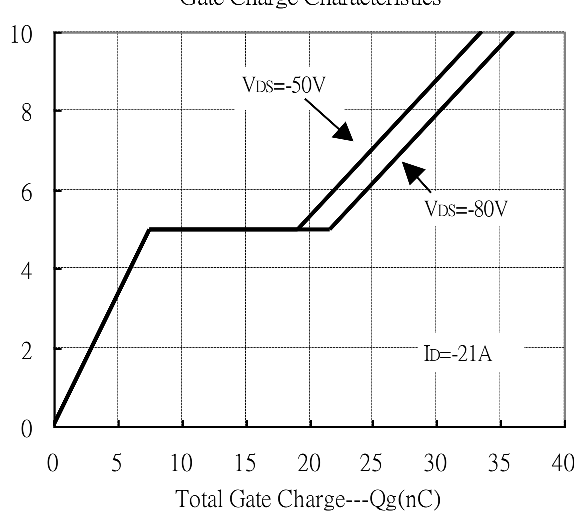
Ciss
Coss
Crss

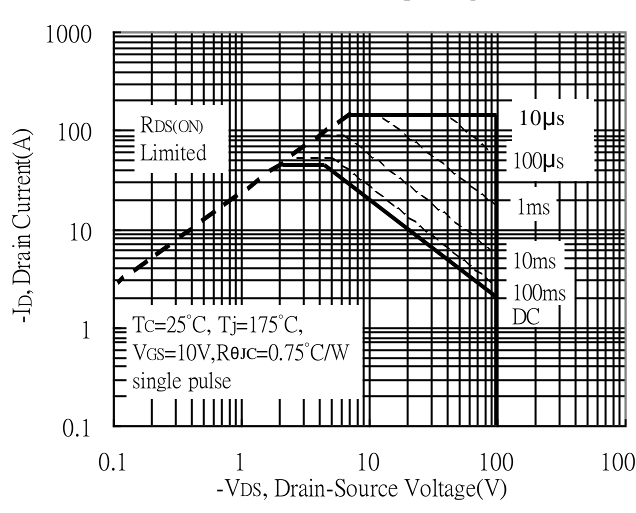
0 5 10 15 20 25 30

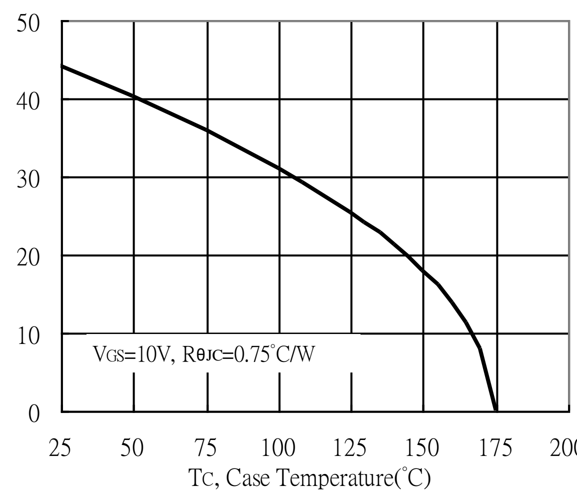
-VDS, Drain-Source Voltage(V)











Typical Characteristics(Cont.)

Typical Transfer Characteristics

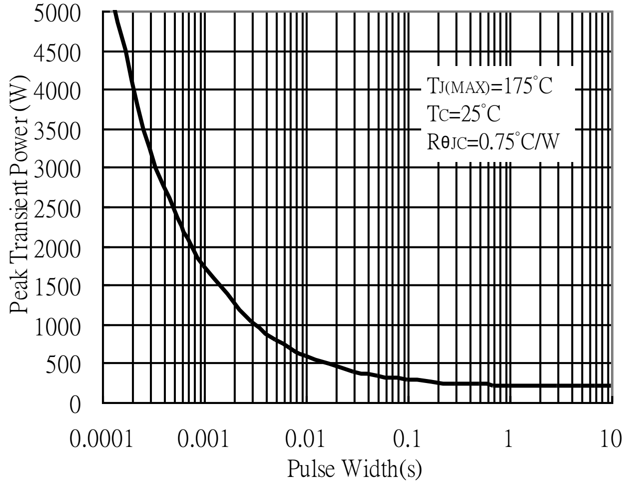
V_{DS}=-10V

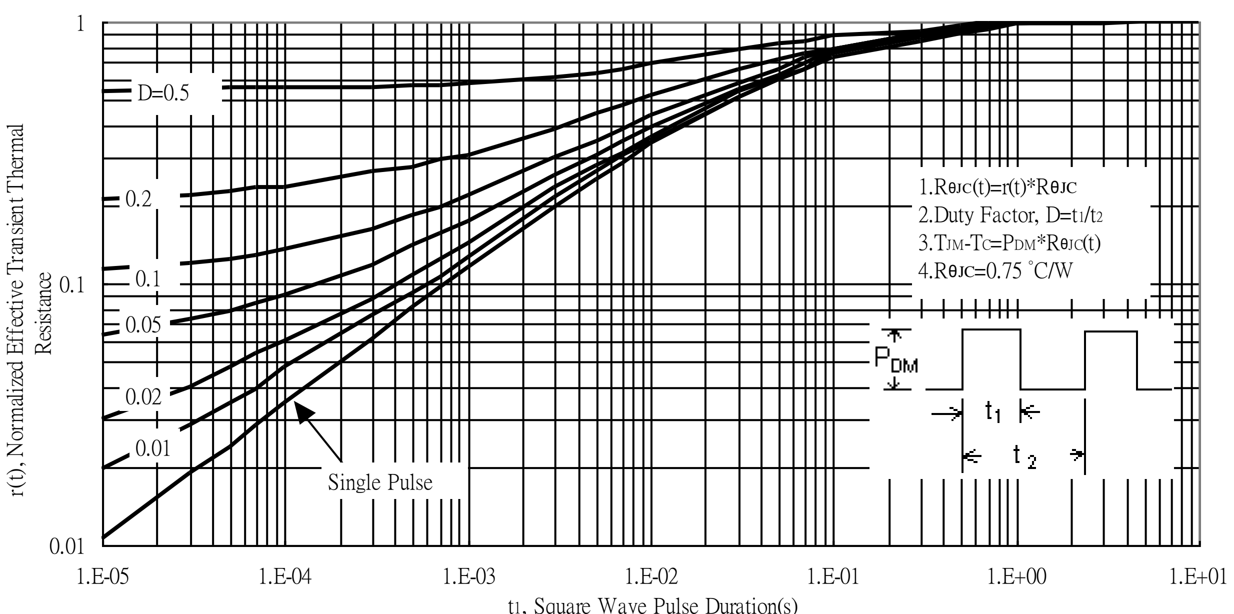
100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 0

$-I_D$, Drain Current (A)

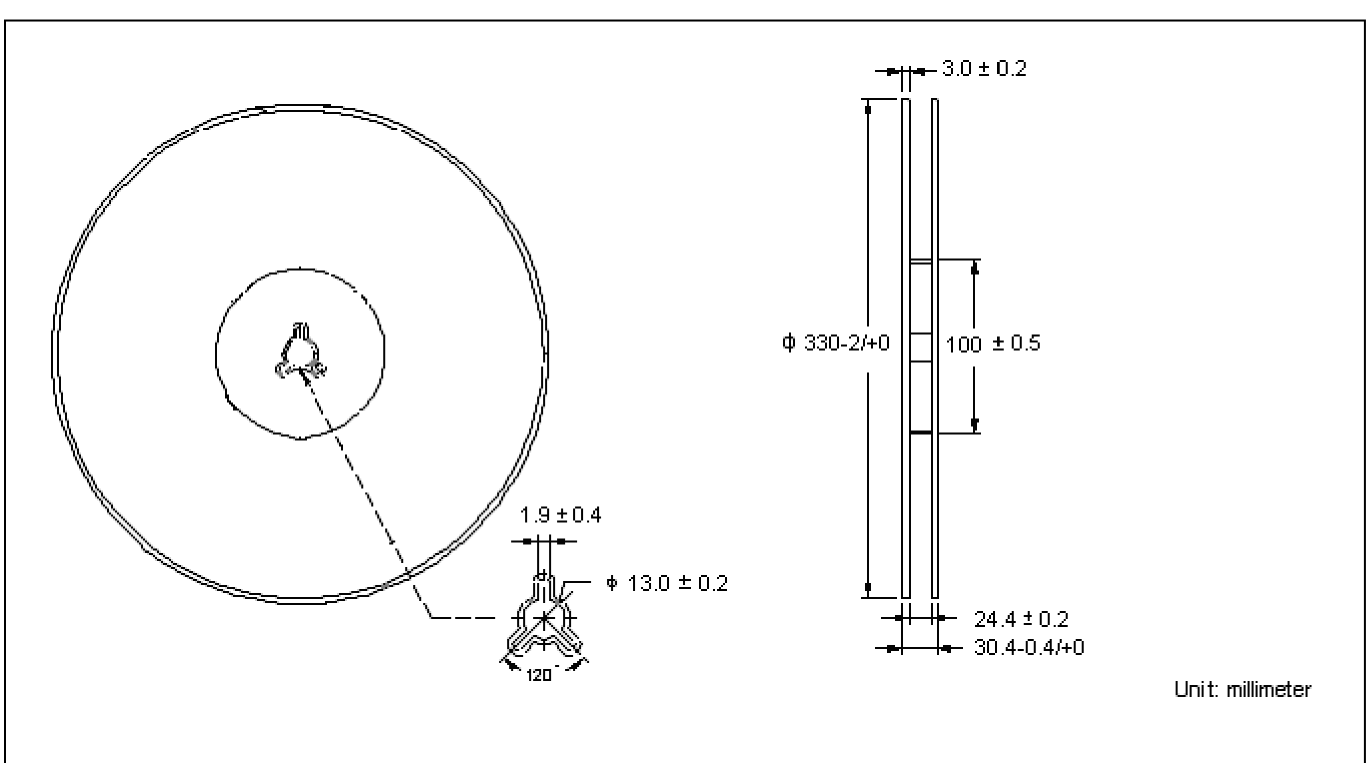
0, 2, 4, 6, 8, 10

$-V_{GS}$, Gate-Source Voltage(V)

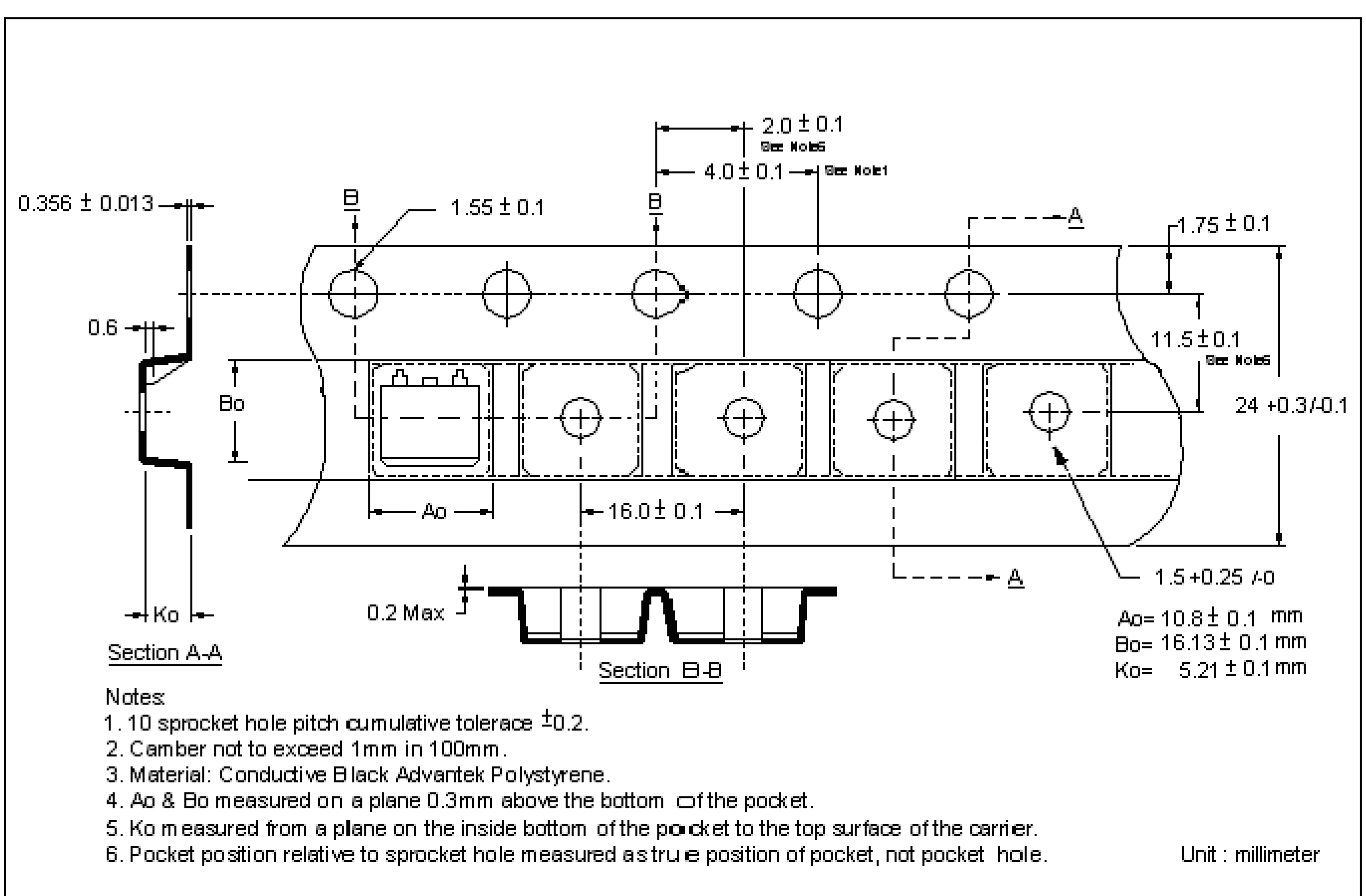




Reel Dimension



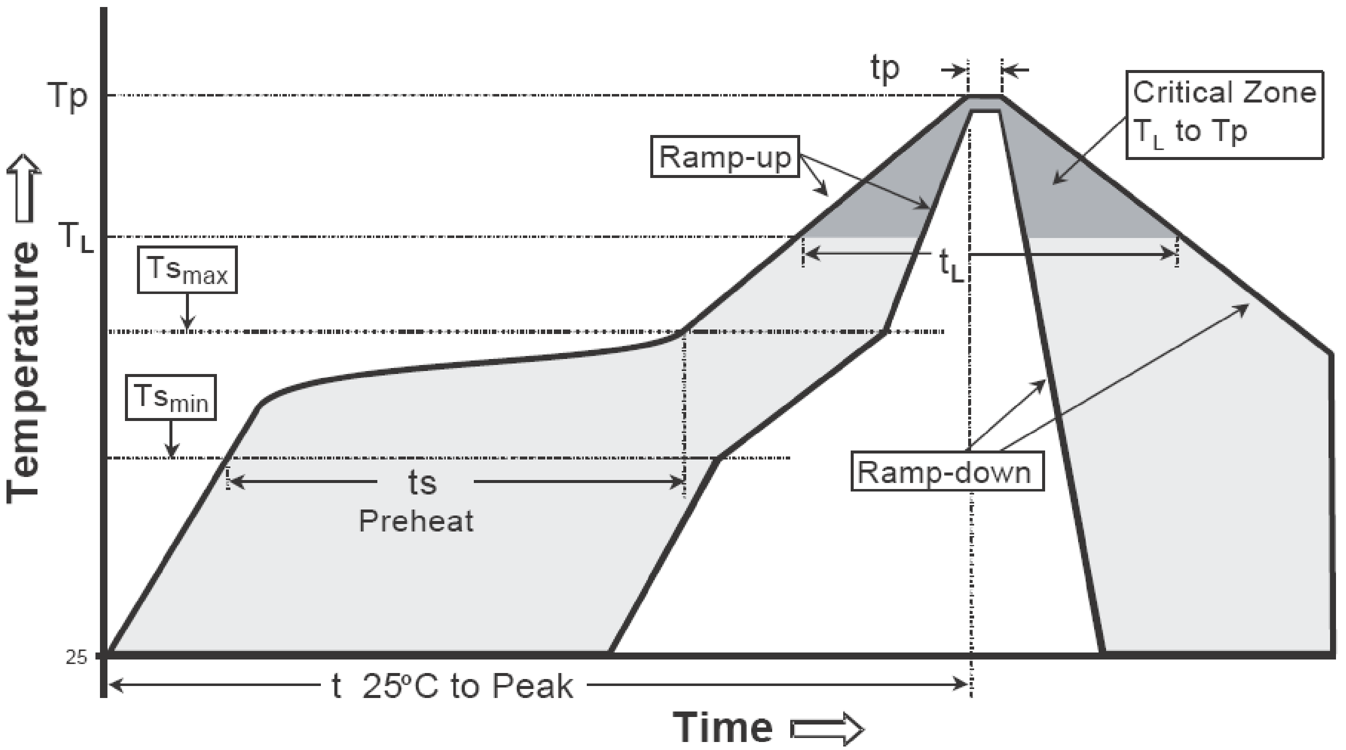
Carrier Tape Dimension



Recommended wave soldering condition

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

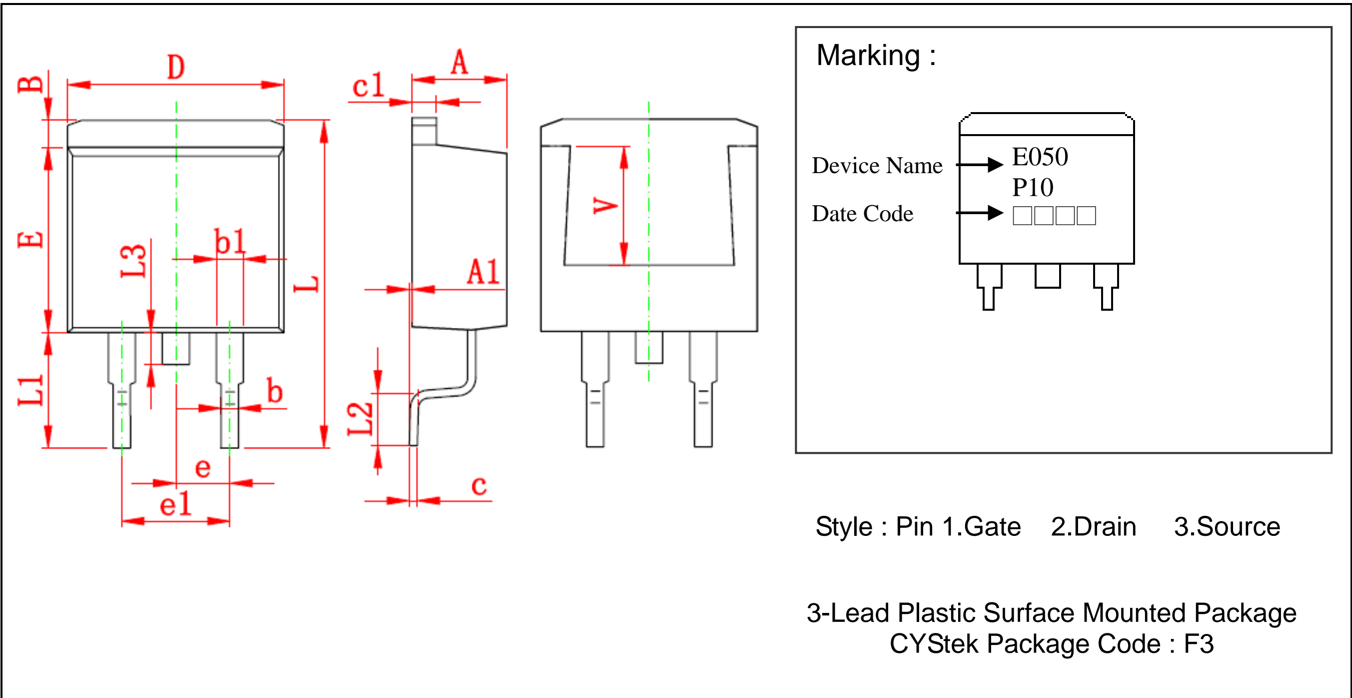
Recommended temperature profile for IR reflow



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) −Temperature Max(Ts 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 (TL) − Time (tL)	 183°C 60-150 seconds	 217°C 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	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184	E	8.500	8.900	0.335	0.350
A1	0.000	0.150	0.000	0.006	e	*2.540		*0.100	
B	1.170	1.370	0.046	0.054	e1	4.980	5.180	0.196	0.204
b	0.710	0.910	0.028	0.036	L	15.050	15.450	0.593	0.608
b1	1.170	1.370	0.046	0.054	L1	5.080	5.480	0.200	0.216
c	0.310	0.530	0.012	0.021	L2	2.340	2.740	0.092	0.108
c1	1.170	1.370	0.046	0.054	L3	1.300	1.700	0.051	0.067
D	10.010	10.310	0.394	0.406	V	5.600 REF		0.220 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.

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