N-Channel Enhancement Mode Power MOSFET

MTN20NF06J3

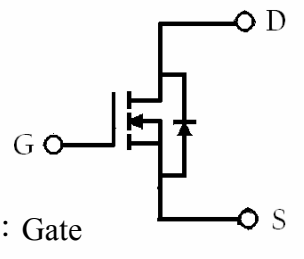
BV_{DSS}	60V
I_D	60A
R_{DSON}	10.6mΩ(typ)

Features

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

Symbol

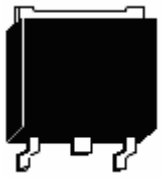
MTN20NF06J3



G：Gate
D：Drain
S：Source

Outline

TO-252(DPAK)



G D S

Ordering Information

Device	Package	Shipping
MTN20NF06J3-0-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)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current @ T_C=25°C		I_D	60	A
Continuous Drain Current @ T_C=100°C			42	
Pulsed Drain Current	(Note 1)	I_{DM}	240	
Avalanche Current	(Note 1)	I_{AR}	30	
Avalanche Energy	(Note 2)	E_{AS}	386	mJ
Repetitive Avalanche Energy	(Note 1)	E_{AR}	9	
Power Dissipation (T_C=25℃)		P_D	110	W
Derates above 25°C			0.73	W/°C
Operating Junction and Storage Temperature		Tj, Tstg	-55~+175	°C

Note : *1. Repetitive Rating : Pulse width limited by maximum junction temperature
*2. L=500 μH, I_{AS}=30A, V_{DD}=25V, starting T_J=+25℃

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	1.36	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	110	°C/W
Maximum Lead Temperature for Soldering purpose (Note)	T_J	275	°C

Note : 1.6mm from case, for 10 seconds

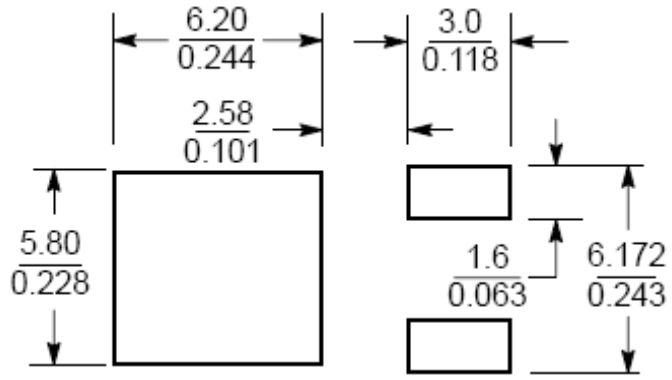
Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	60	-	-	V	V_{GS}=0, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.06	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2	3.2	4	V	V_{DS} = V_{GS}, I_D=250μA
G_{FS}	-	13	-	S	V_{DS} =10V, I_D=25A
I_{GSS}	-	-	±100	nA	V_{GS}=±20
I_{DSS}	-	-	1	μA	V_{DS} =60V, V_{GS} =0
	-	-	25		V_{DS} =48V, V_{GS} =0, T_C=125°C
*$R_{DS(ON)}$	-	10.6	14	mΩ	V_{GS} =10V, I_D=30A
Dynamic					
*Qg	-	67	-	nC	I_D=60A, V_{DS}=48V, V_{GS}=10V
*Qgs	-	18	-		
*Qgd	-	30	-		
*$t_{d(ON)}$	-	20	-	ns	V_{DS}=30V, I_D=30A, V_{GS}=10V, R_{GS}=4.7Ω
*tr	-	24	-		
*$t_{d(OFF)}$	-	50	-		
*t_f	-	36	-		

Ciss	-	3768	-	pF	V_{GS}=0V, V_{DS}=25V, f=1MHz
Coss	-	146	-		
Crss	-	129	-		
Source-Drain Diode					
*I_S	-	-	50	A	
*I_{SM}	-	-	200		
*V_{SD}	-	-	1.5	V	I_S=50A, V_{GS}=0
*trr	-	52	-	ns	I_S=50A, dI_F/dt=100A/μs, V_{GS}=0
*Qrr	-	75	-	nC	

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

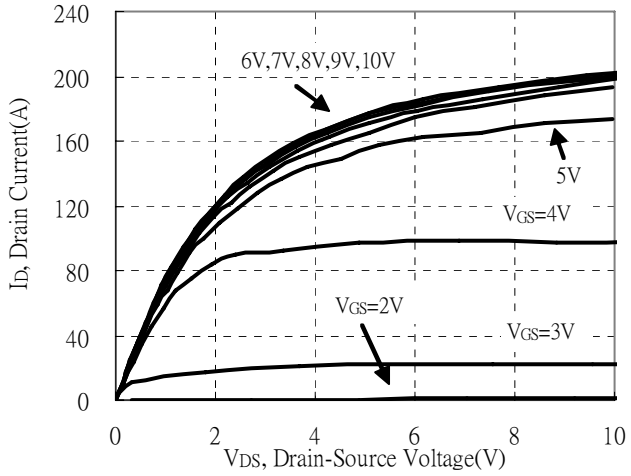
Recommended soldering footprint



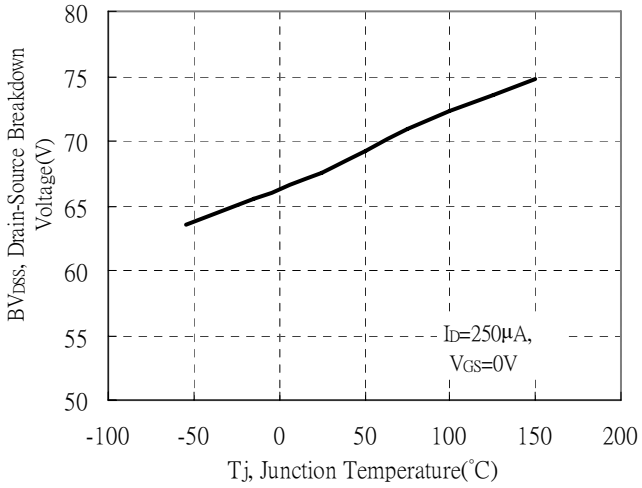
Unit (mm / inch)

Typical Characteristics

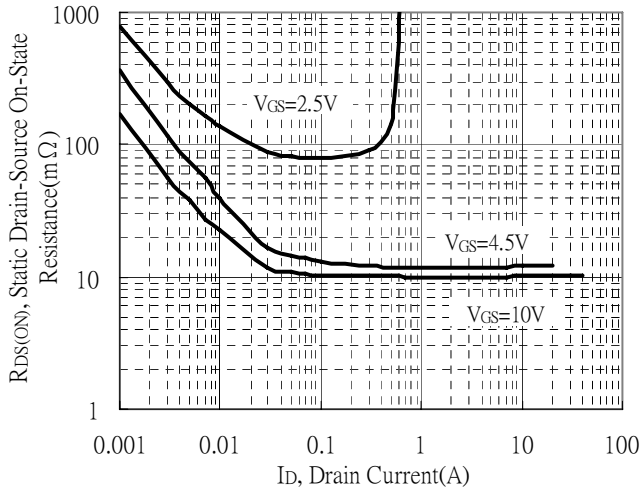
Typical Output Characteristics



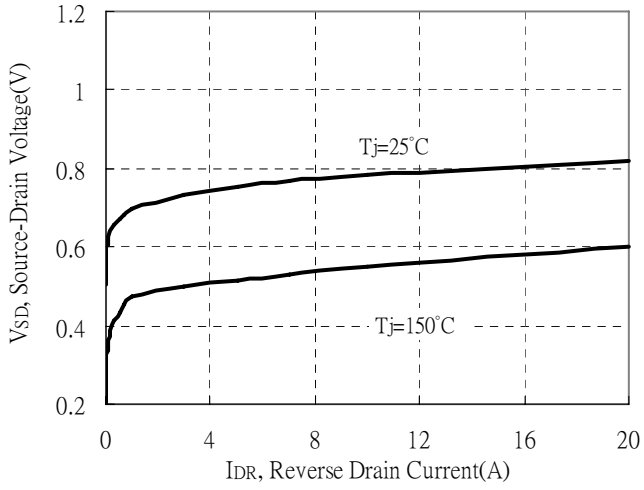
Brekdown Voltage vs Ambient Temperature



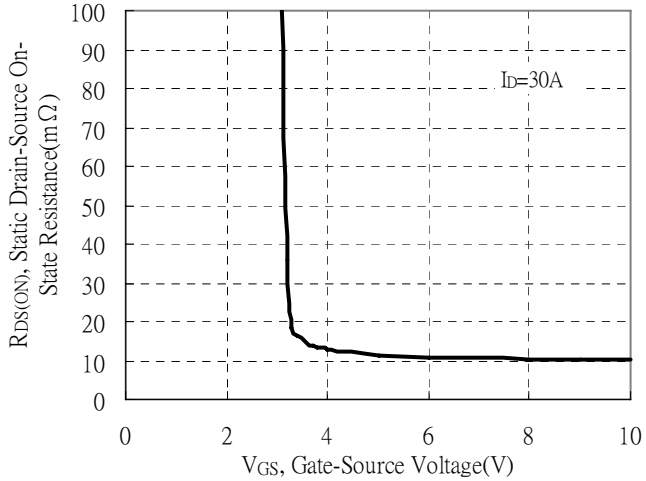
Static Drain-Source On-State resistance vs Drain Current



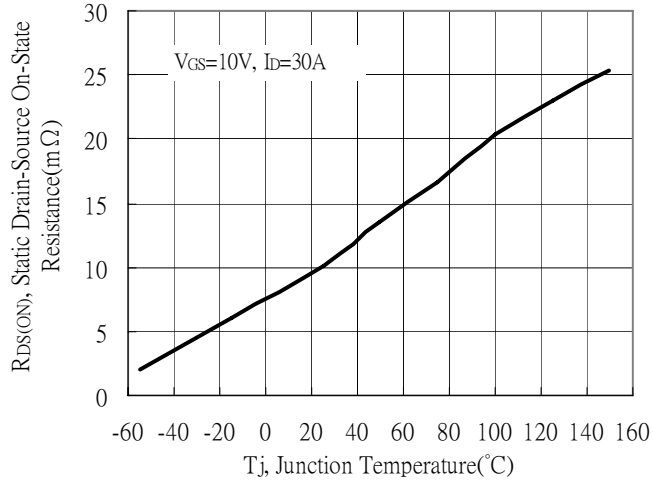
Reverse Drain Current vs Source-Drain Voltage



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

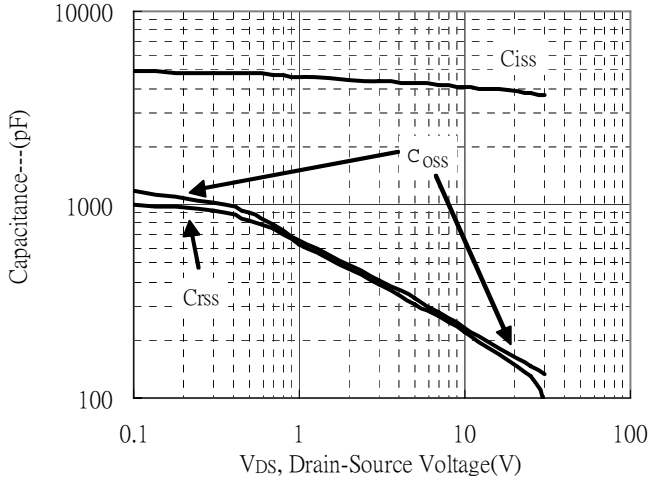


Drain-Source On-State Resistance vs Junction Tempearture

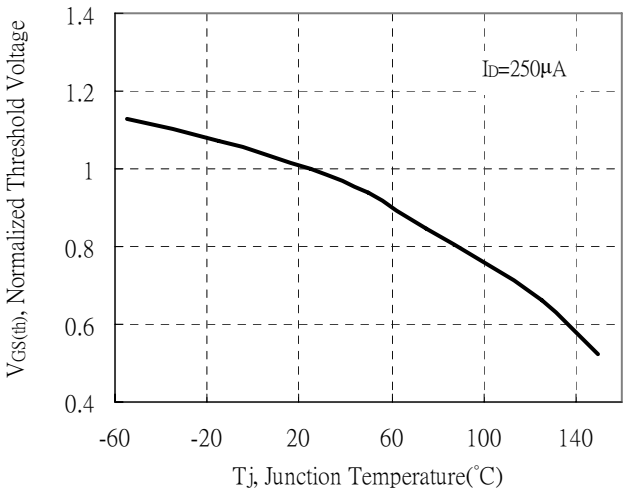


Typical Characteristics(Cont.)

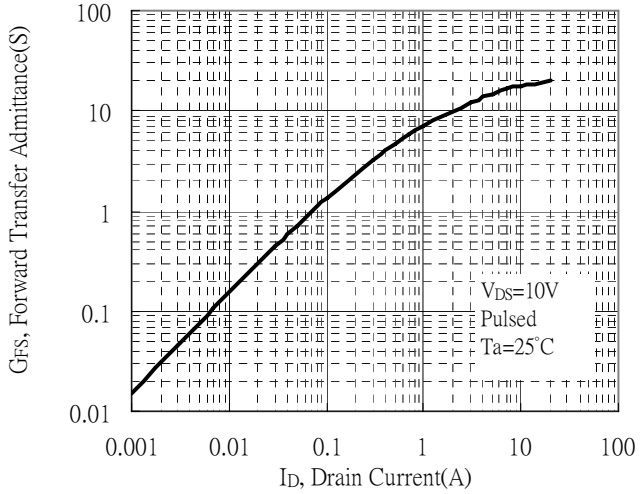
Capacitance vs Drain-to-Source Voltage



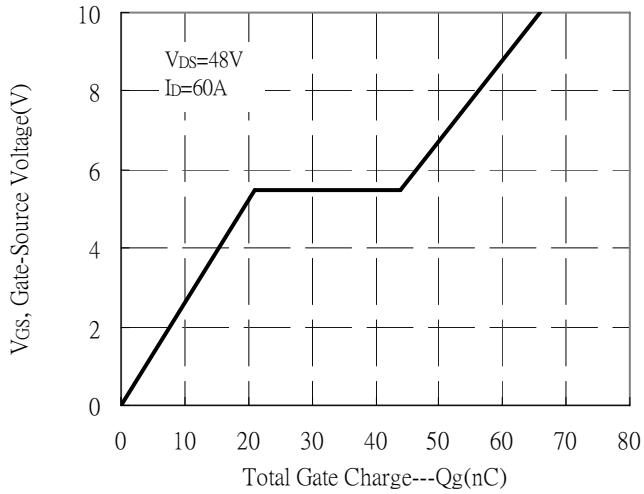
NormalizedThreshold Voltage vs Junction Tempearture



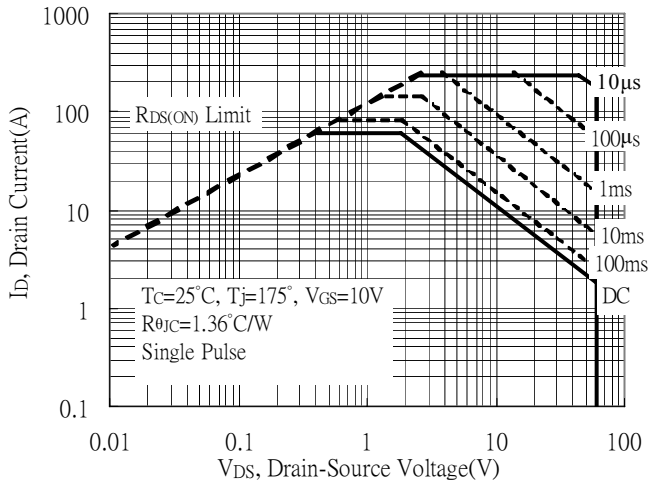
Forward Transfer Admittance vs Drain Current



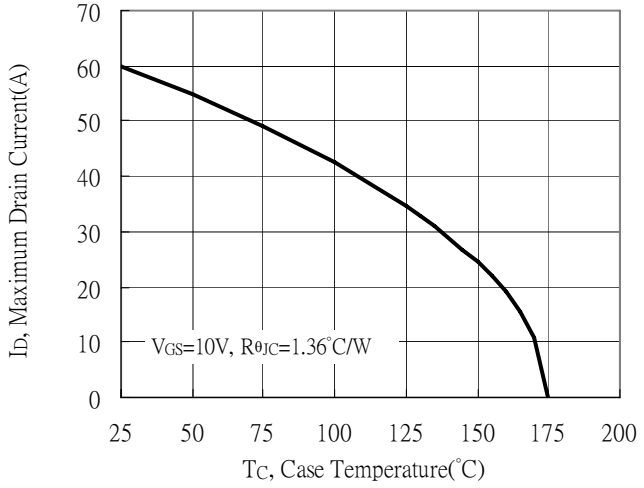
Gate Charge Characteristics



Maximum Safe Operating Area

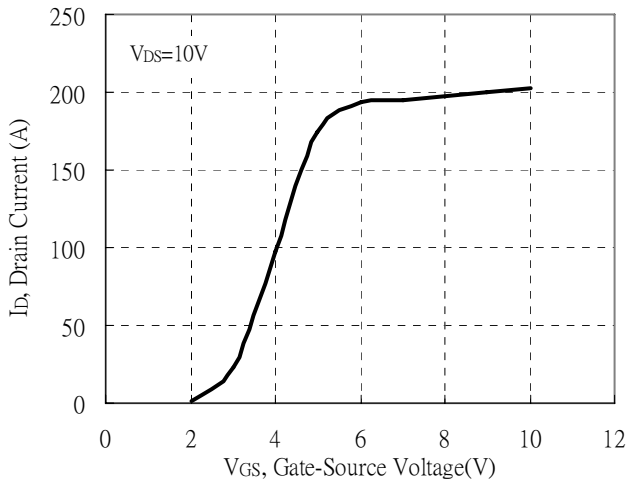


Maximum Drain Current vs Case Temperature

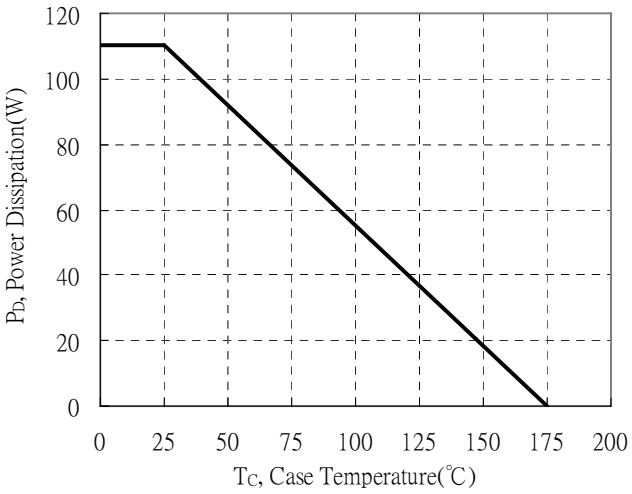


Typical Characteristics(Cont.)

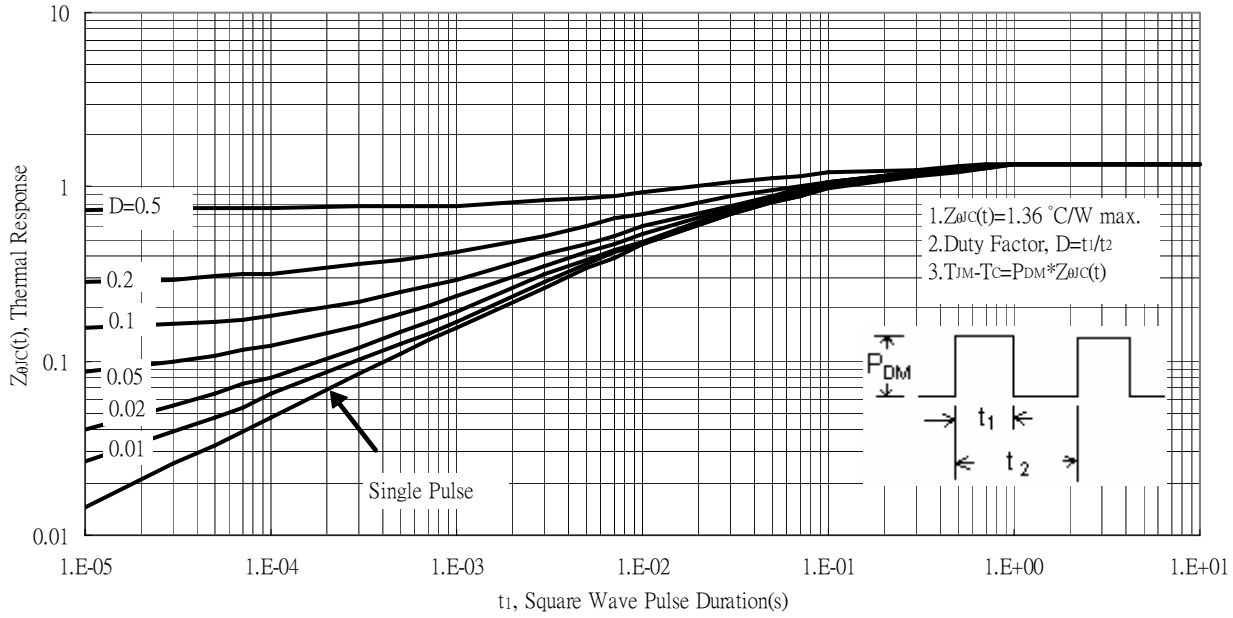
Typical Transfer Characteristics



Power Derating Curve

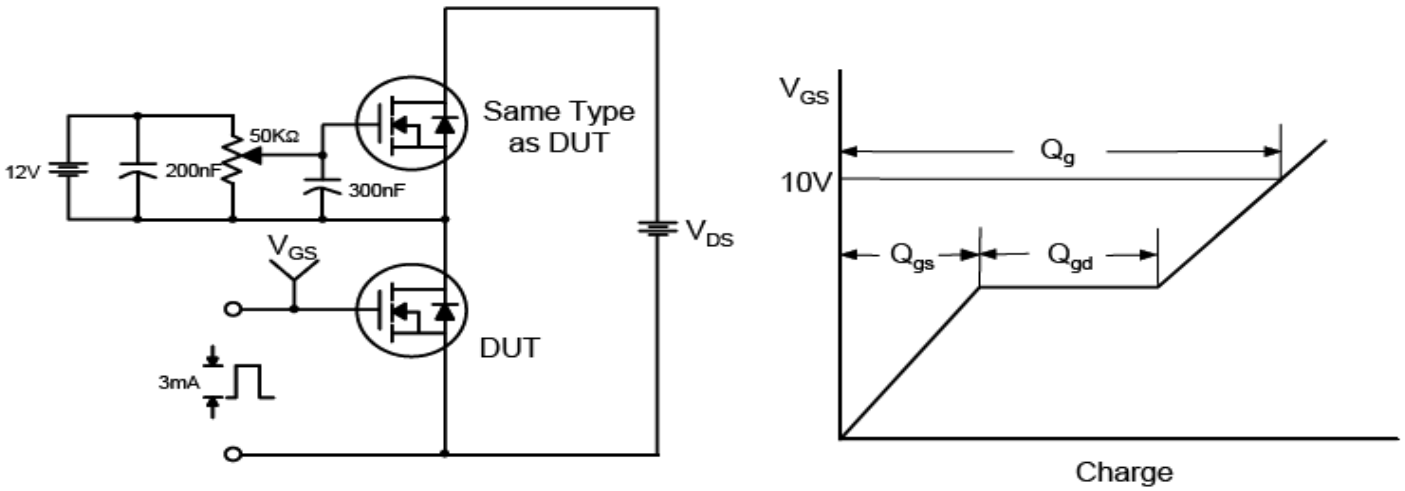


Transient Thermal Response Curves

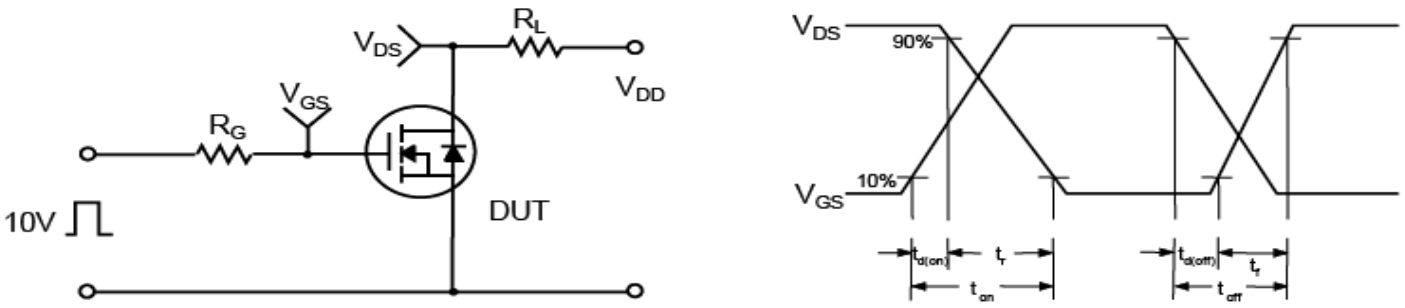


Test Circuit and Waveforms

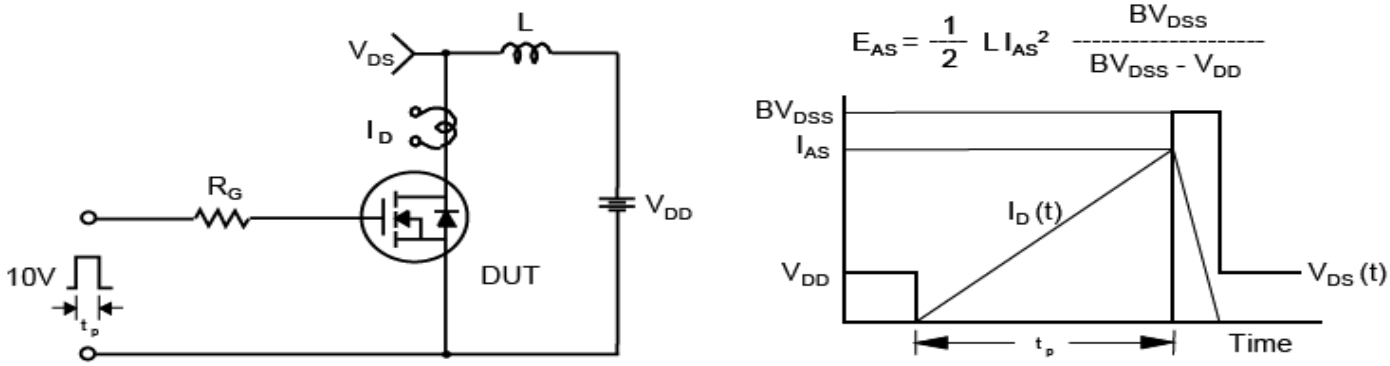
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

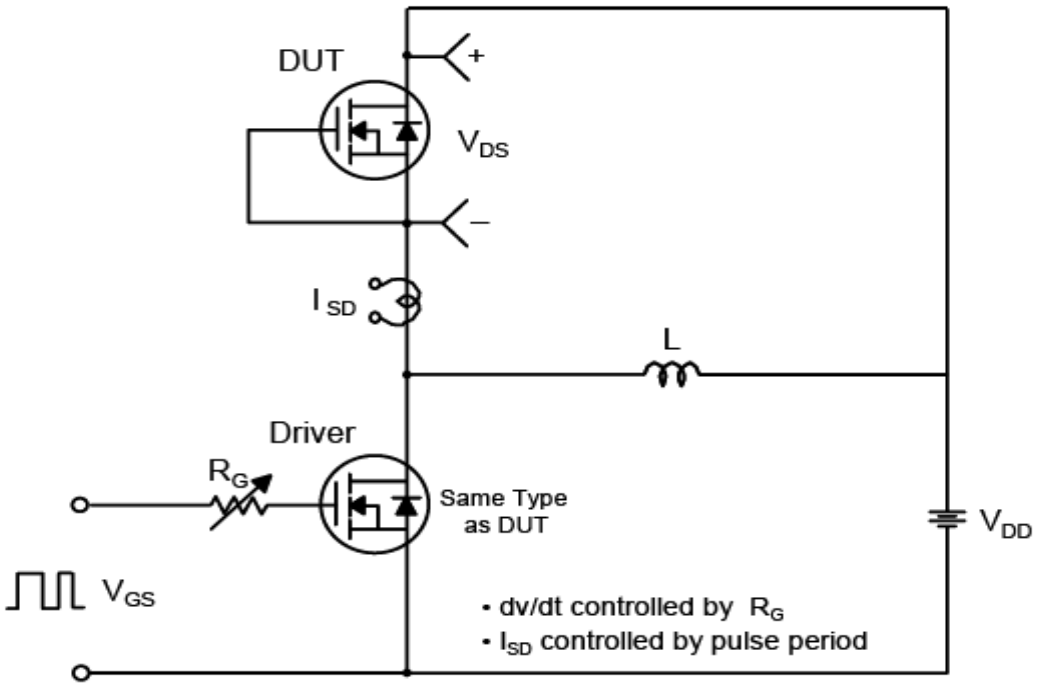


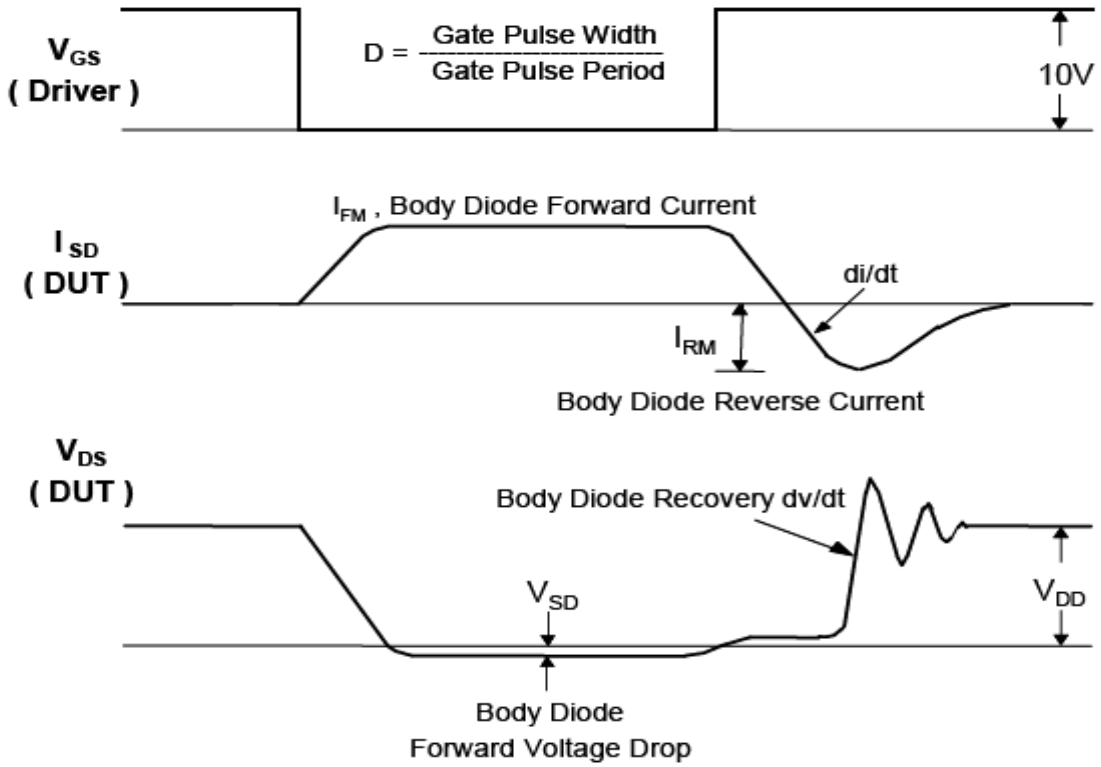
Unclamped Inductive Switching Test Circuit & Waveforms



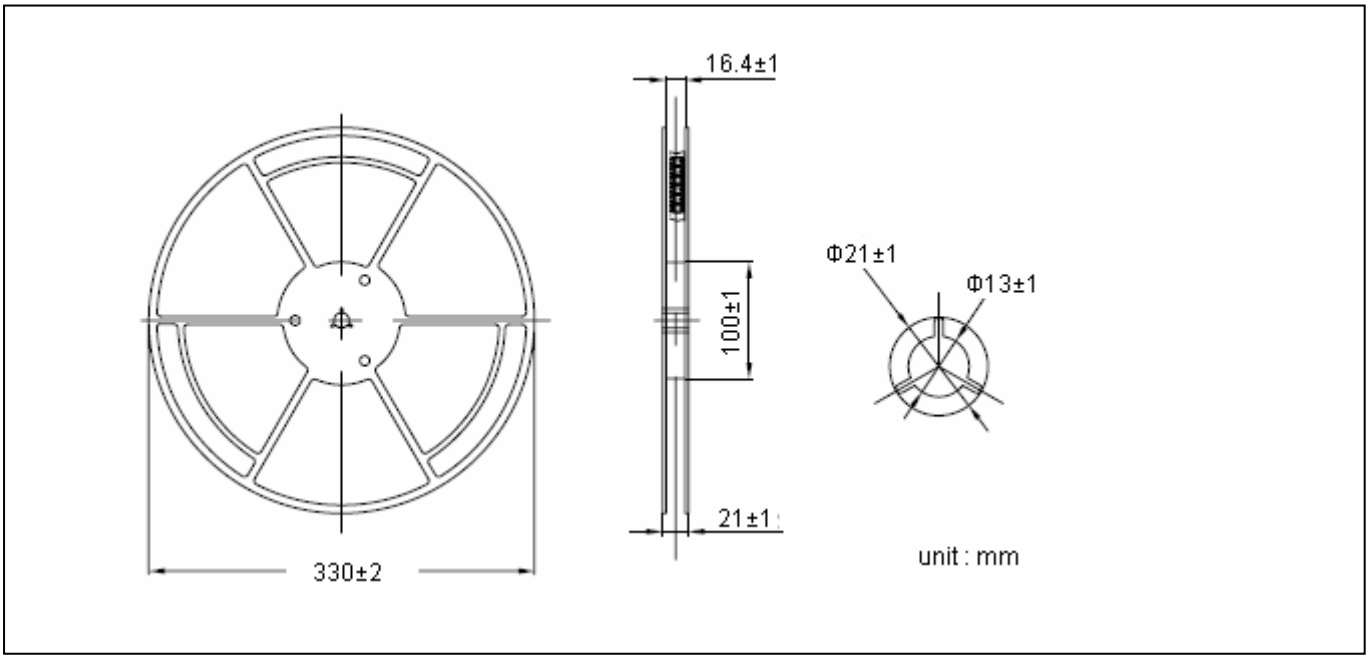
Test Circuit and Waveforms(Cont.)

Peak Diode Recovery dv/dt Test Circuit & Waveforms

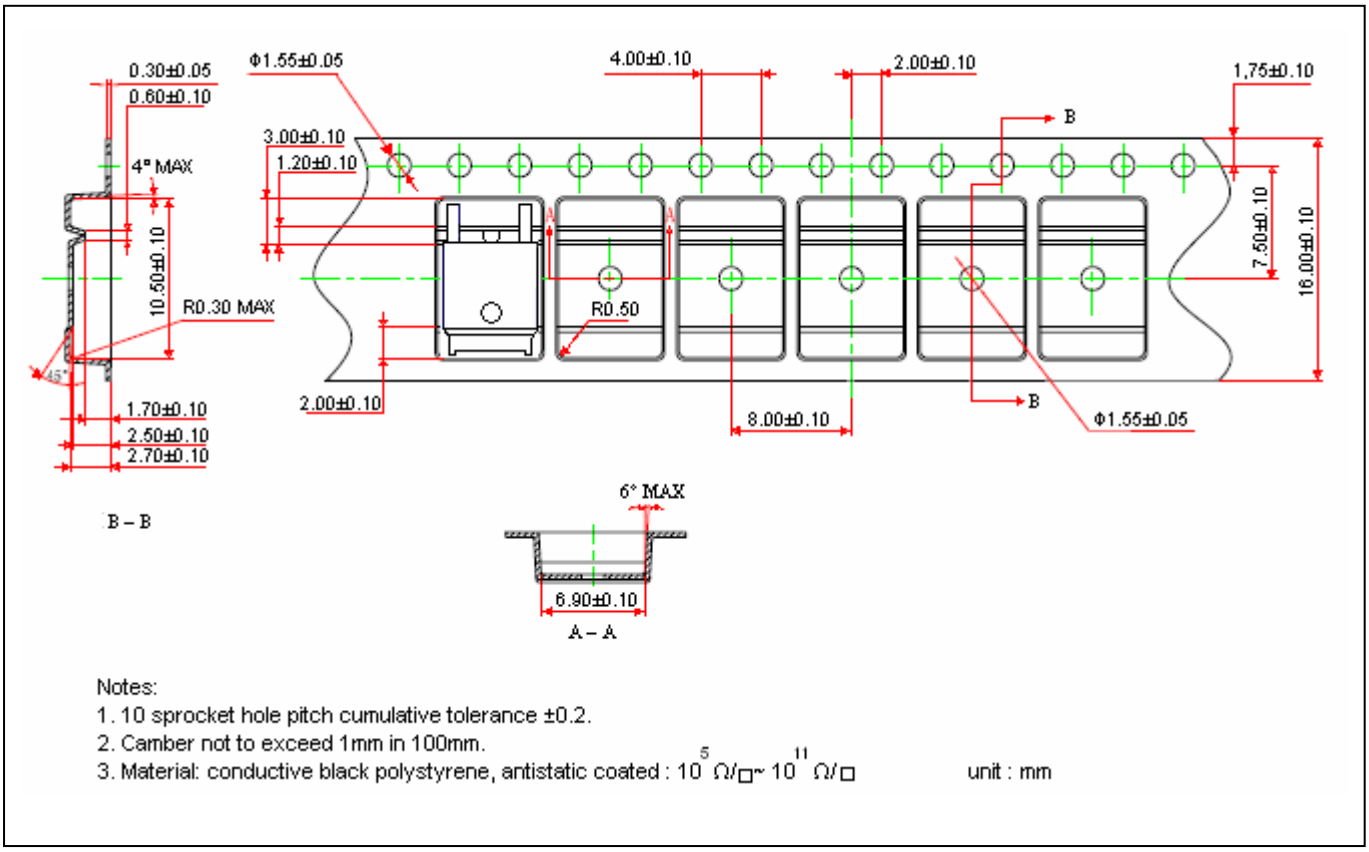




Reel Dimension



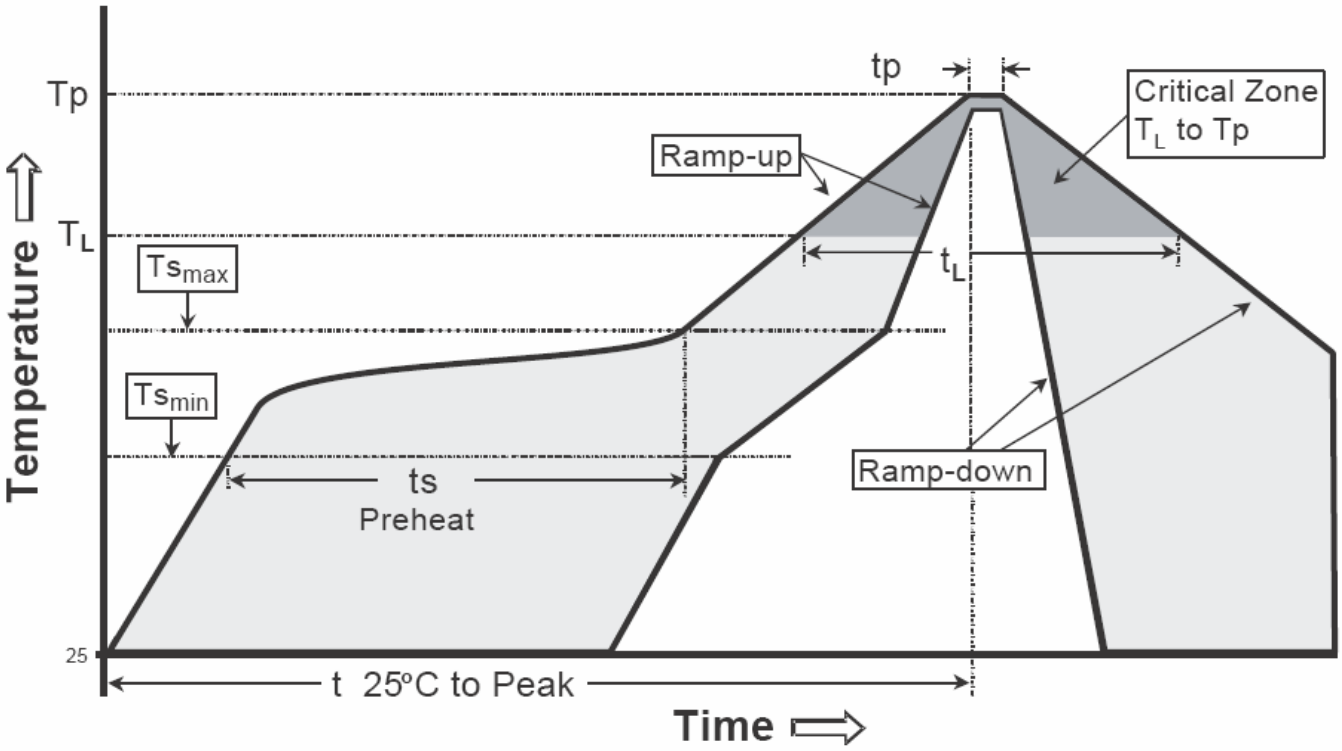
Carrier Tape Dimension



Recommended wave soldering condition

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

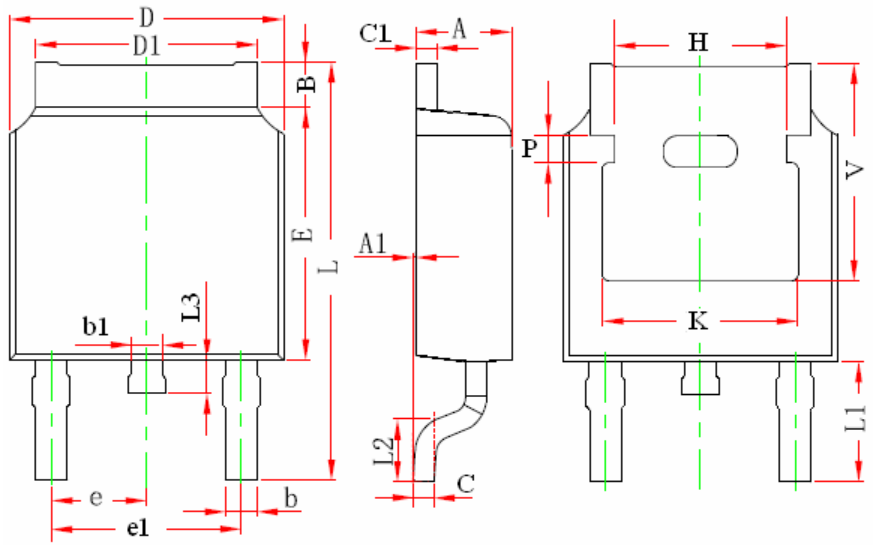
Recommended temperature profile for IR reflow

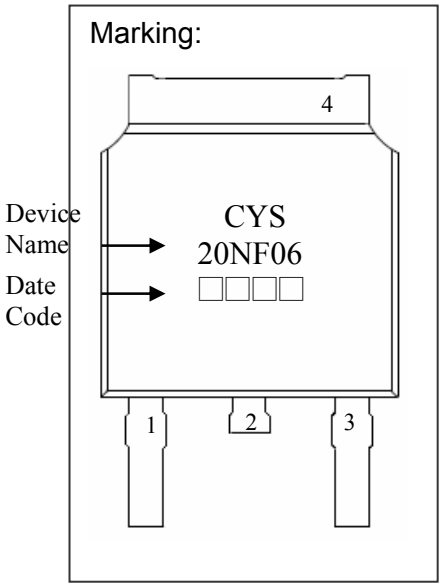


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature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





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

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

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.087	0.094	2.200	2.400	e	0.086	0.094	2.186	2.386
A1	0.000	0.005	0.000	0.127	e1	0.172	0.188	4.372	4.772
B	0.039	0.048	0.990	1.210	H	0.163	REF	4.140	REF
b	0.026	0.034	0.660	0.860	K	0.190	REF	4.830	REF
b1	0.026	0.034	0.660	0.860	L	0.386	0.409	9.800	10.400
C	0.018	0.023	0.460	0.580	L1	0.114	REF	2.900	REF
C1	0.018	0.023	0.460	0.580	L2	0.055	0.067	1.400	1.700
D	0.256	0.264	6.500	6.700	L3	0.024	0.039	0.600	1.000
D1	0.201	0.215	5.100	5.460	P	0.026	REF	0.650	REF
E	0.236	0.244	6.000	6.200	V	0.211	REF	5.350	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.