N-Channel Enhancement Mode Power MOSFET

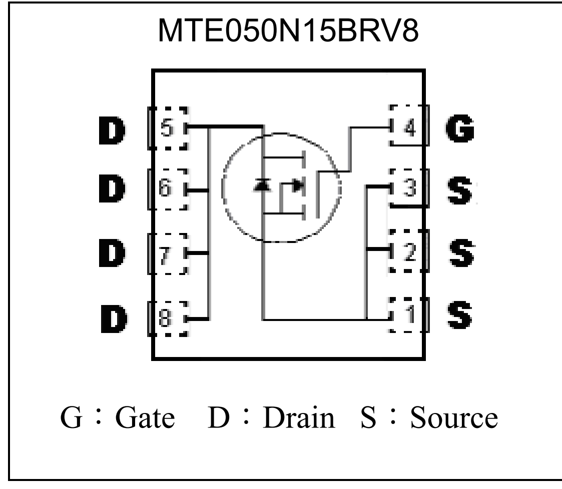
MTE050N15BRV8

BV_{DSS}		150V
I_D @ T_C=25°C, V_{GS}=10V		12.4A
I_D @ T_A=25°C, V_{GS}=10V		4.3A
$R_{DSON(TYP)}$	V_{GS}=10V, I_D=3.4A	49.1mΩ
	V_{GS}=6V, I_D=3.3A	58.5mΩ

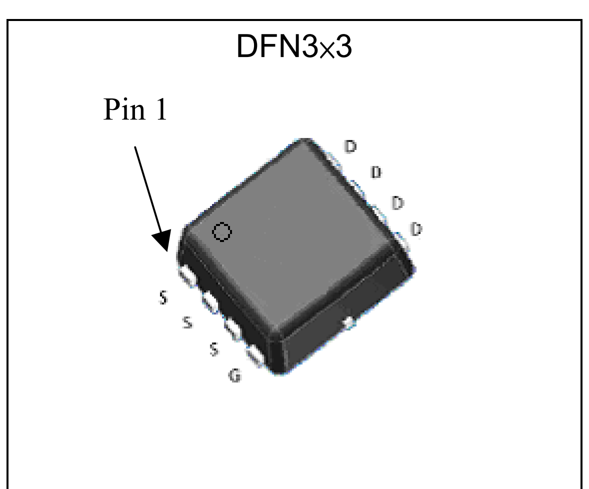
Features

- Single Drive Requirement
- Low On-resistance
- Fast Switching Characteristic
- Pb-free lead plating and halogen-free package

Equivalent Circuit

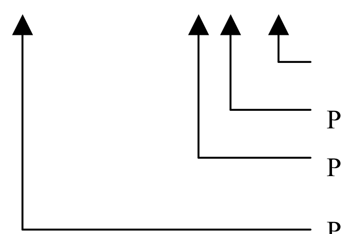


Outline



Ordering Information

Device	Package	Shipping
MTE050N15BRV8-0-T6-G	DFN3x3 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel



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

Packing spec, T6 : 3000 pcs / tape & reel,13" reel

Product rank, zero for no rank products

Product name

Absolute Maximum Ratings (Ta=25°C, unless otherwise specified)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	150	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @ V_{GS}=10V, T_C=25°C		I_D	12.4	A
Continuous Drain Current @ V_{GS}=10V, T_C=100°C			7.8	
Continuous Drain Current @ V_{GS}=10V, T_A=25°C		I_{DSM}	4.3	
Continuous Drain Current @ V_{GS}=10V, T_A=70°C			3.4	
Pulsed Drain Current		I_{DM}	50 *1	
Avalanche Current @ L=0.1mH		I_{AS}	36	
Avalanche Energy @ L=1mH, I_D=16A, V_{DD}=25V		E_{AS}	128	mJ
Total Power Dissipation	T_C=25℃	P_D	21	W
	T_C=100℃		8.4	
	T_A=25℃	P_{DSM}	2.5 *2	
	T_A=70℃		1.6 *2	
Operating Junction and Storage Temperature Range		Tj, Tstg	-55~+150	°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{θJC}$	6	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{θJA}$	50 *2	

Note : 1. Pulse width limited by maximum junction temperature.
2. Surface mounted on a 1 in² pad of 2oz copper, t≤10s. In practice $R_{θJA}$ will be determined by customer's PCB characteristics. 125°C/W when mounted on a minimum pad of 2 oz. copper.
3. 100% tested by conditions of L=0.1mH, I_{AS}=4.5A, V_{GS}=10V, V_{DD}=25V

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

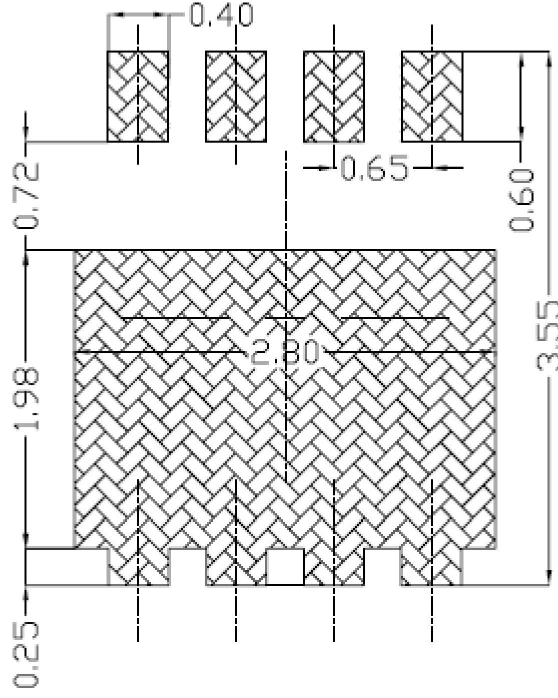
Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	150	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	2	-	4		V_{DS} = V_{GS}, I_D=250μA
G_{FS} *1	-	5.5	-	S	V_{DS} =15V, I_D=3A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS} =120V, V_{GS} =0V
	-	-	5		V_{DS} =120V, V_{GS} =0V, Tj=55°C
$R_{DS(ON)}$ *1	-	49.1	65	mΩ	V_{GS} =10V, I_D=3.4A
	-	58.5	82		V_{GS} =6V, I_D=3.3A
Dynamic					
Ciss	-	1206	1809	pF	V_{DS}=80V, V_{GS}=0V, f=1MHz
Coss	-	80	-		
Crss	-	7.3	-		
Qg *1, 2	-	20.1	30	nC	V_{DS}=75V, V_{GS}=10V, I_D=3.4A
Qgs *1, 2	-	5.3	-		
Qgd *1, 2	-	4.7	-		

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$ *1, 2	-	15.4	23	ns	V_{DS}=100V, I_D=1A, V_{GS}=10V, R_{GS}=6Ω
t_r *1, 2	-	17.2	26		
$t_{d(OFF)}$ *1, 2	-	35.6	54		
t_f *1, 2	-	8.8	13		
Rg	-	2	3	Ω	f=1MHz
Source-Drain Diode					
I_S *1	-	-	16	A	
V_{SD} *1	-	0.78	1.2	V	I_S=3.2A, V_{GS}=0V
trr	-	44.3	67	ns	I_F=3.2A, dI_F/dt=100A/µs
Qrr	-	71.7	108	nC	

Note : *1.Pulse Test : Pulse Width ≤300µs, Duty Cycle≤2%
*2.Independent of operating temperature

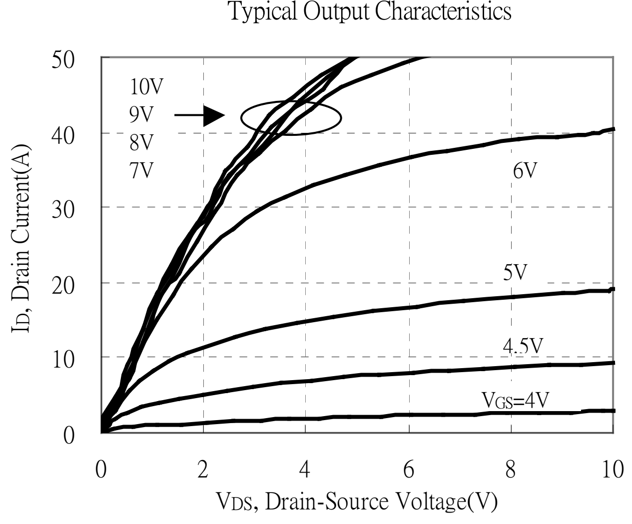
Recommended Soldering Footprint

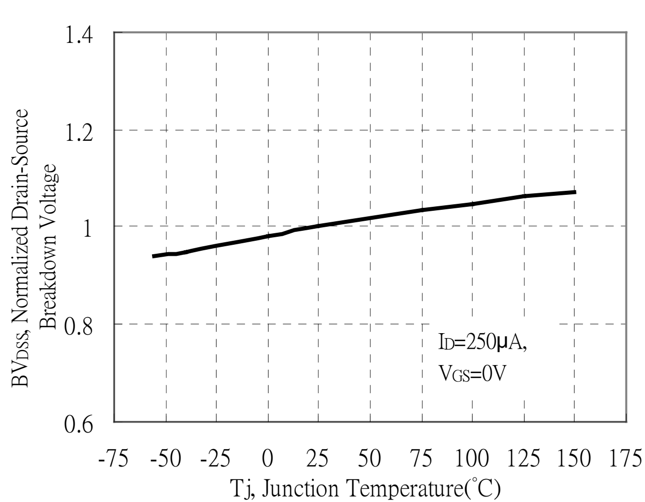


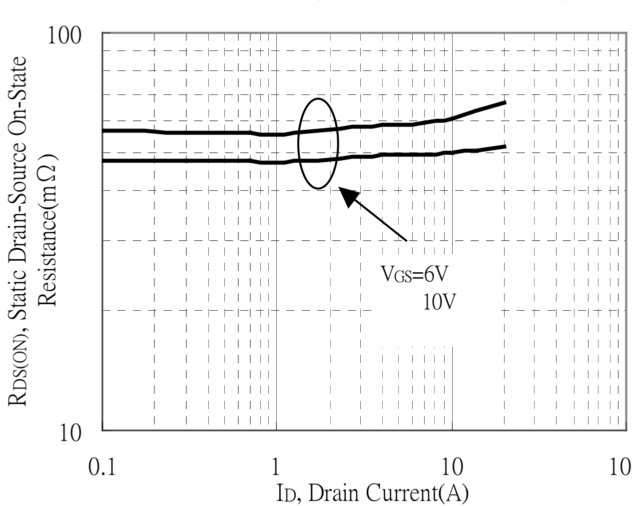
unit : mm

Typical Characteristics

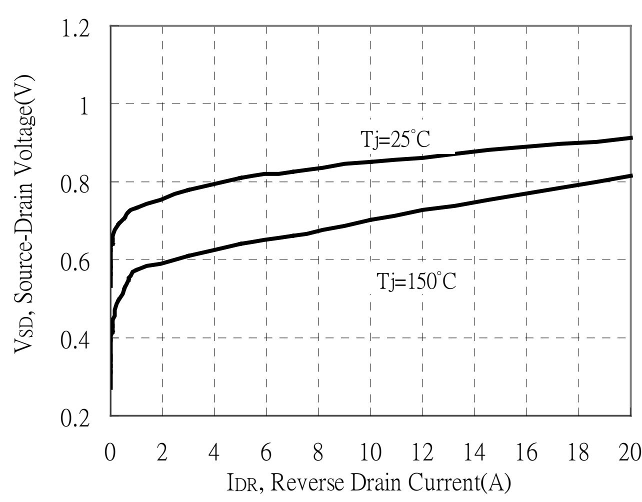
Typical Output Characteristics



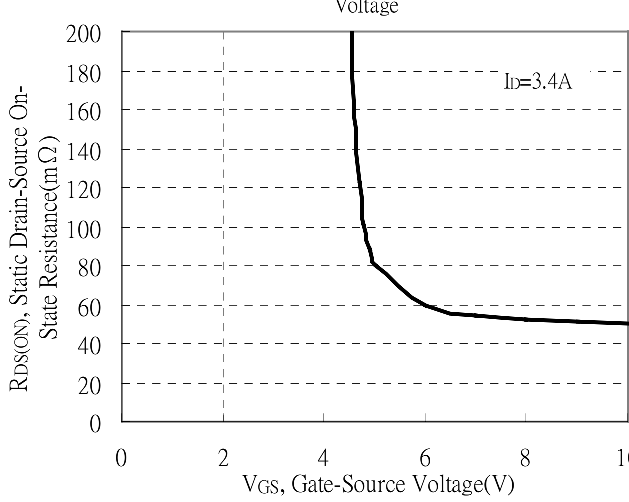




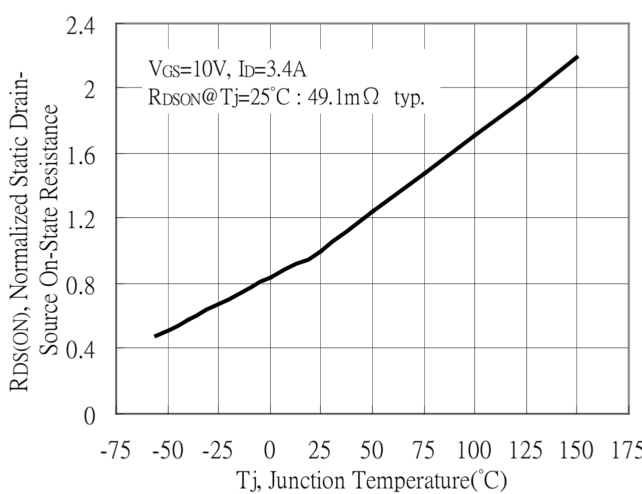
Reverse Drain Current vs Source-Drain Voltage



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

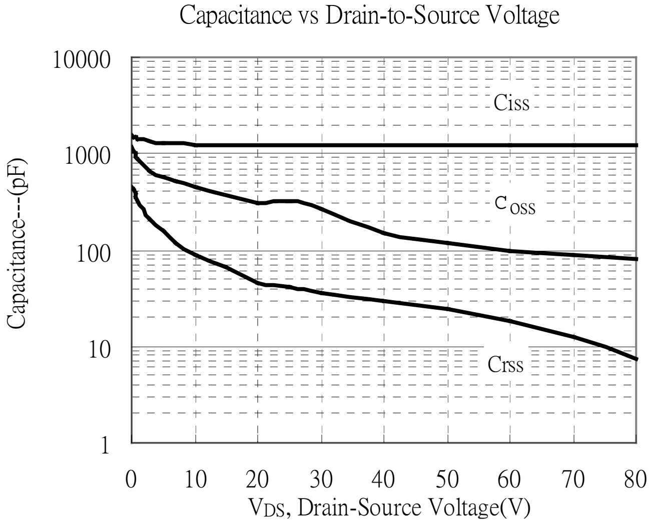


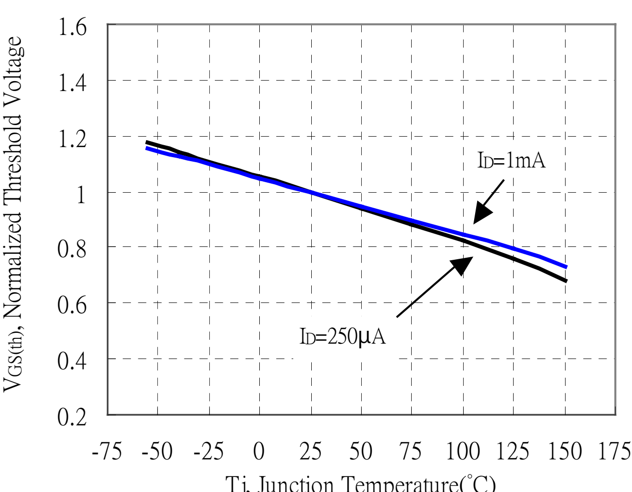
Drain-Source On-State Resistance vs Junction Tempearture

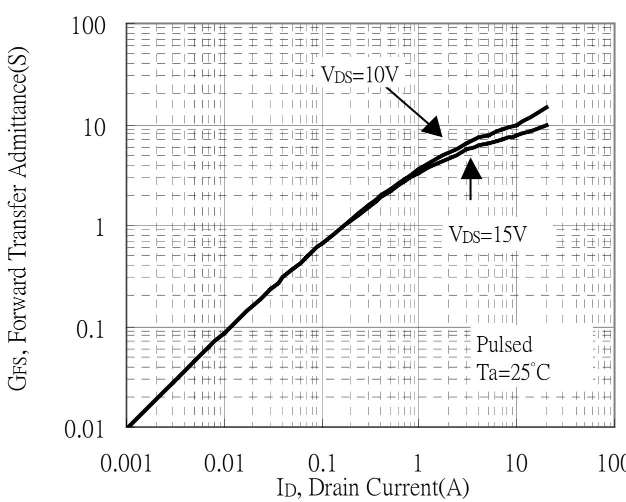


Typical Characteristics(Cont.)

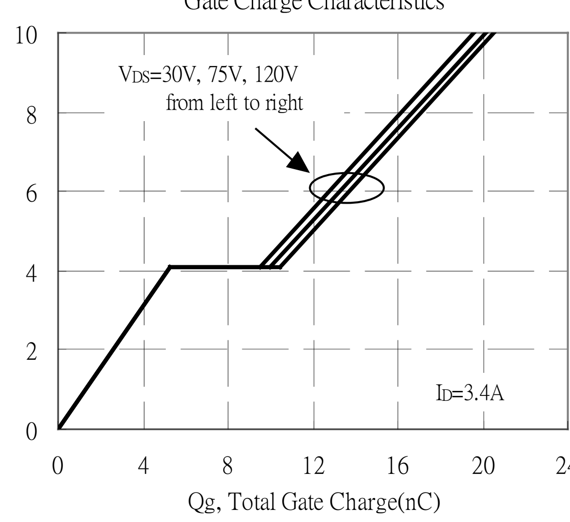
Capacitance vs Drain-to-Source Voltage



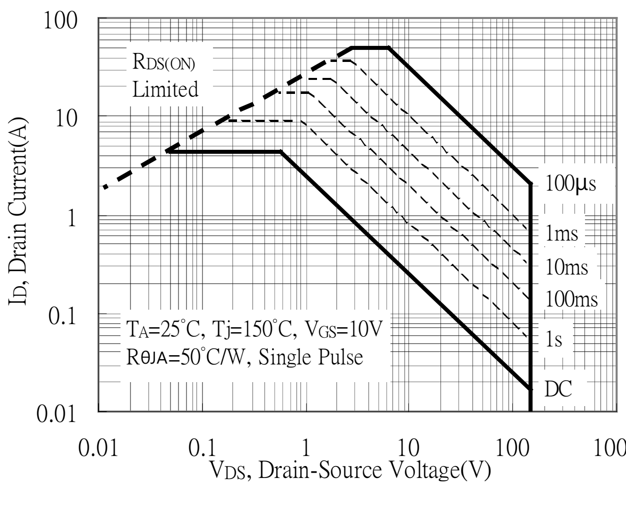




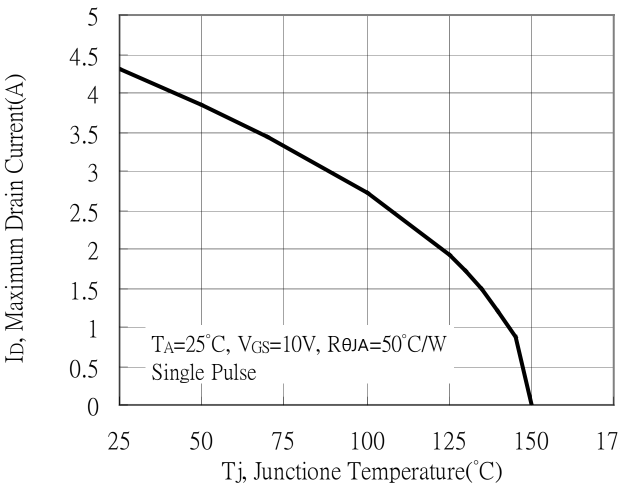
Gate Charge Characteristics



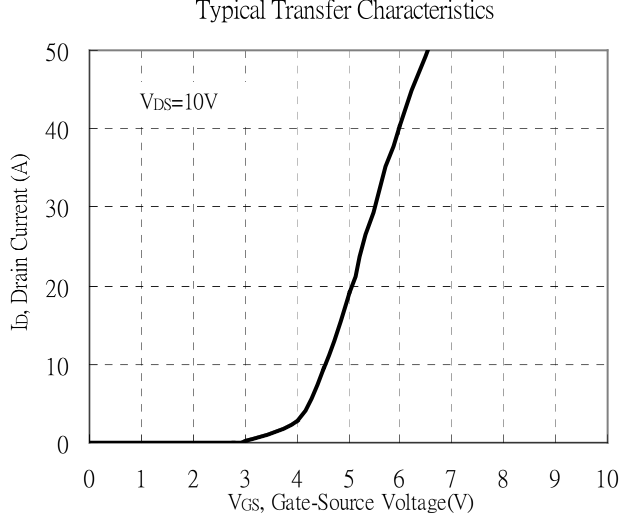
Maximum Safe Operating Area

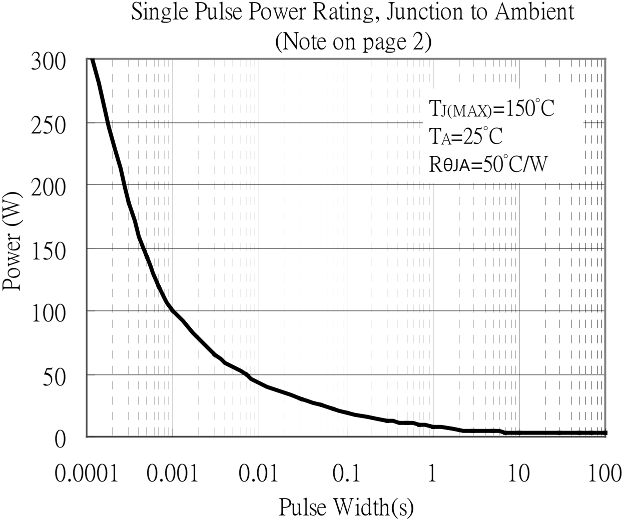


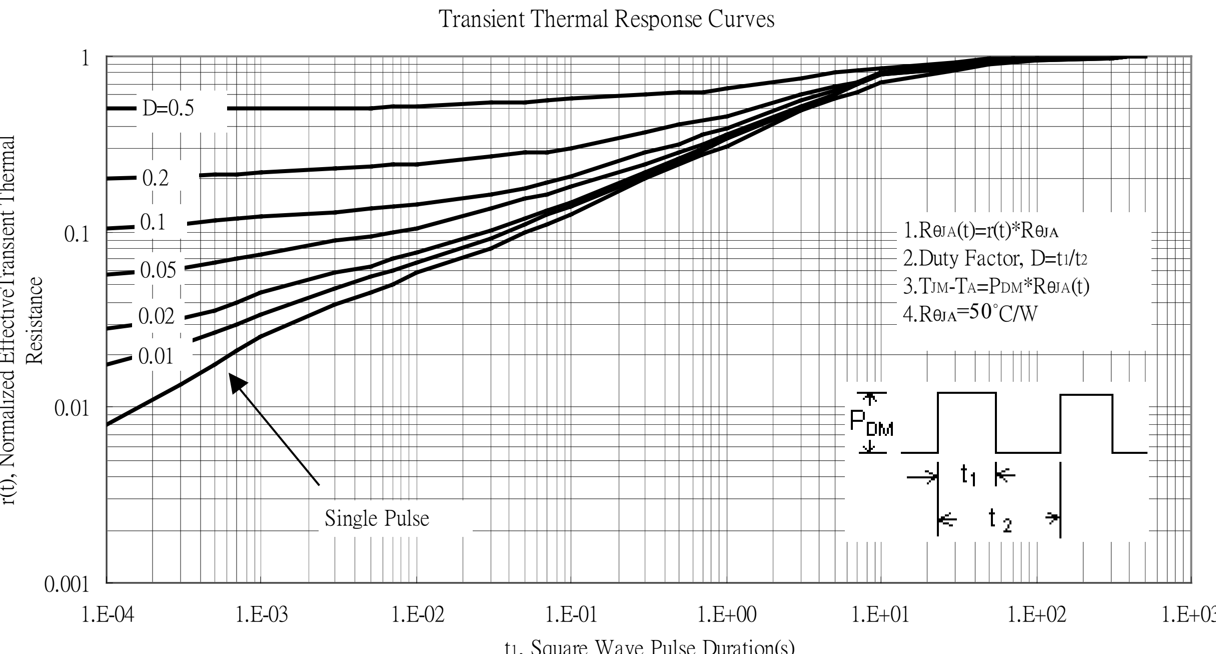
Maximum Drain Current vs Junction Temperature



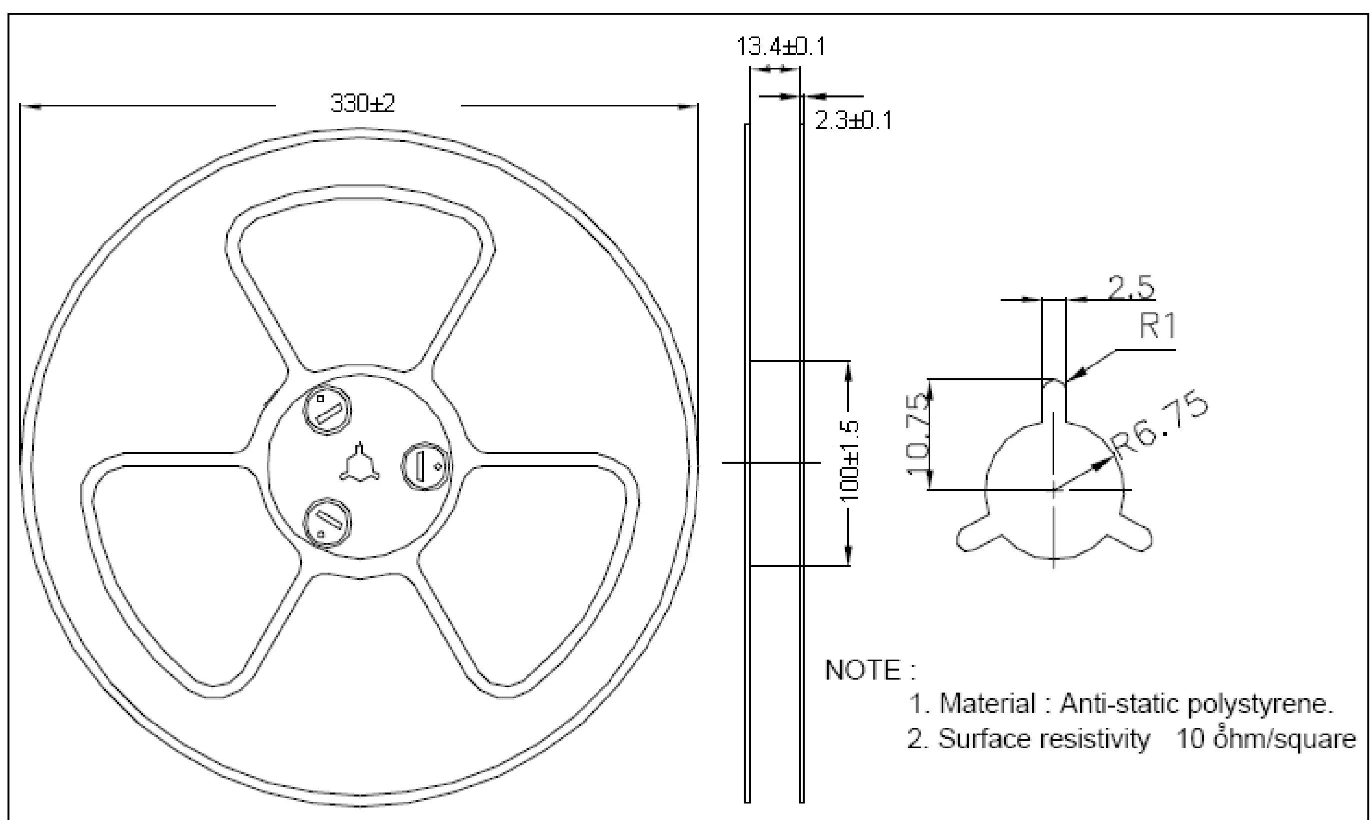
Typical Characteristics(Cont.)



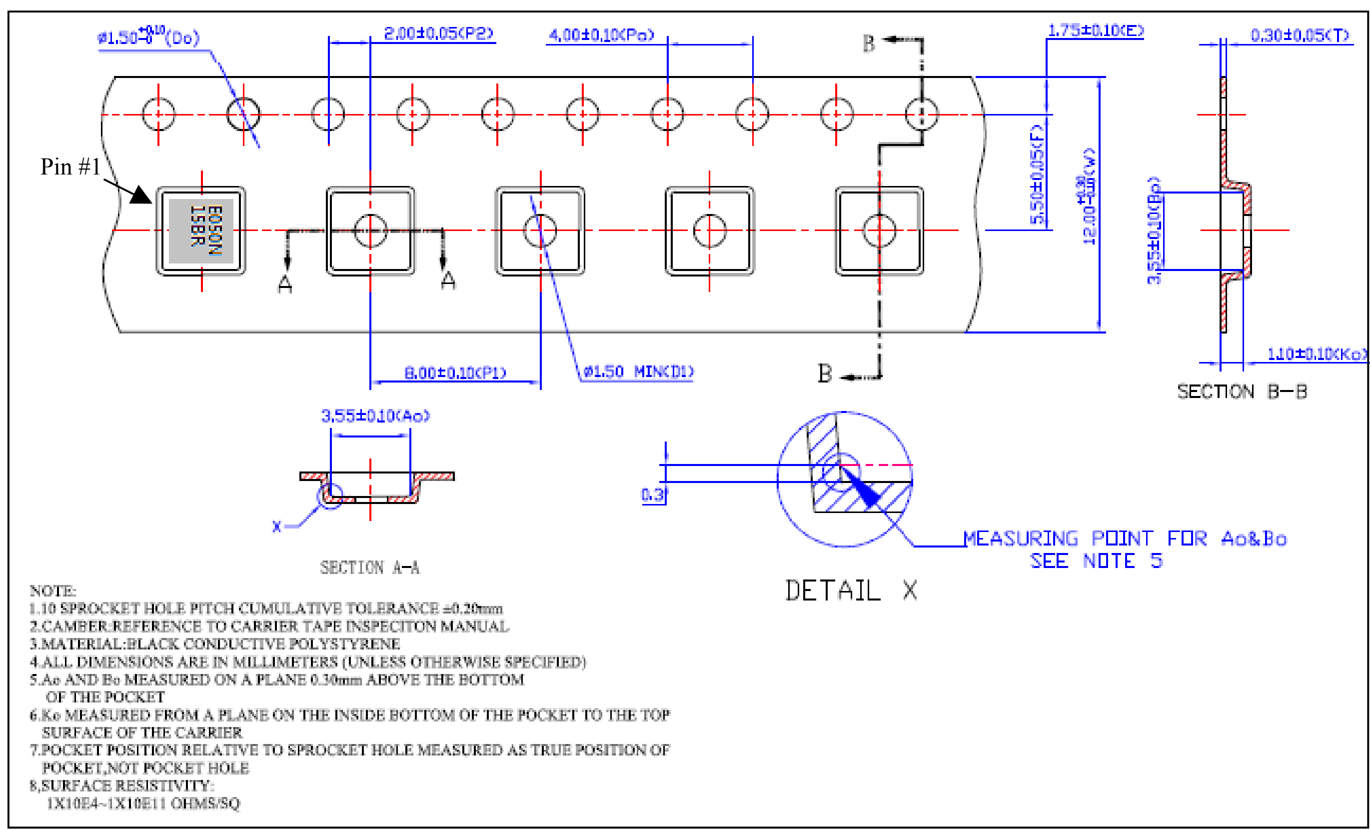




Reel Dimension



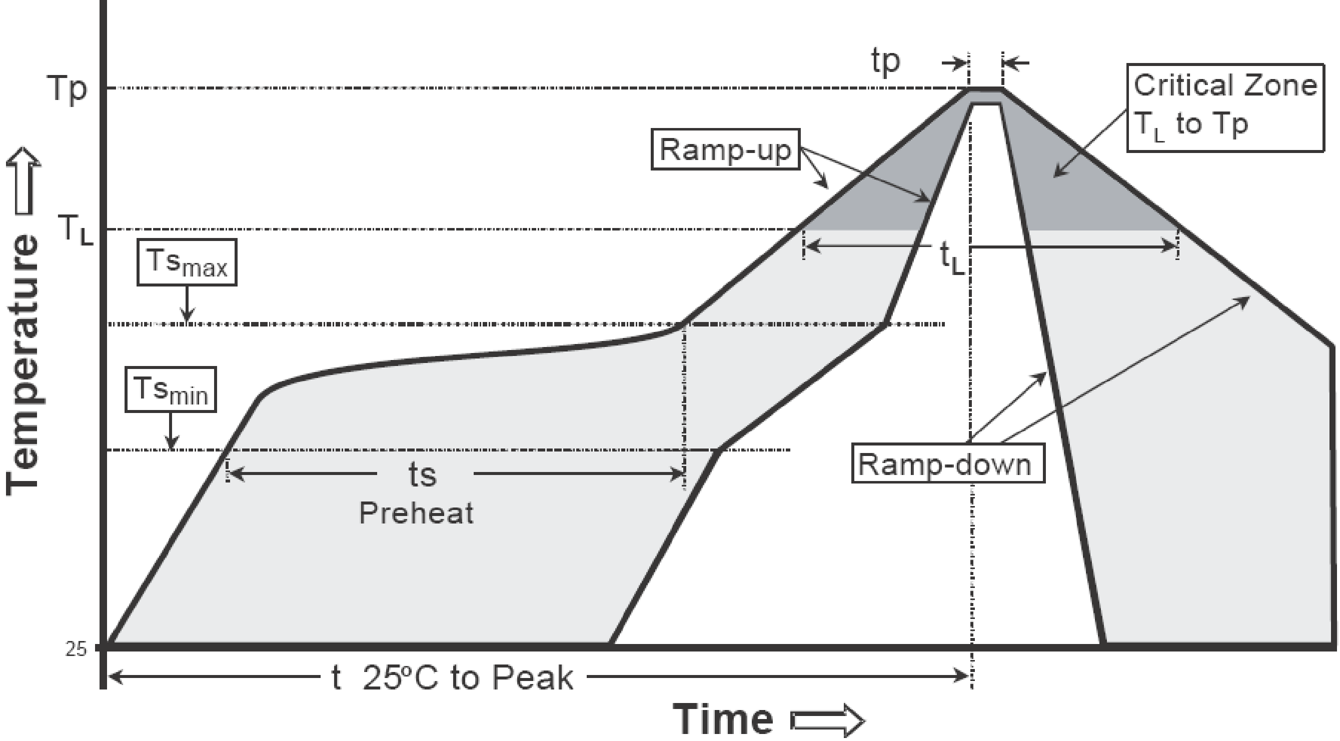
Carrier Tape Dimension



Recommended wave soldering condition

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

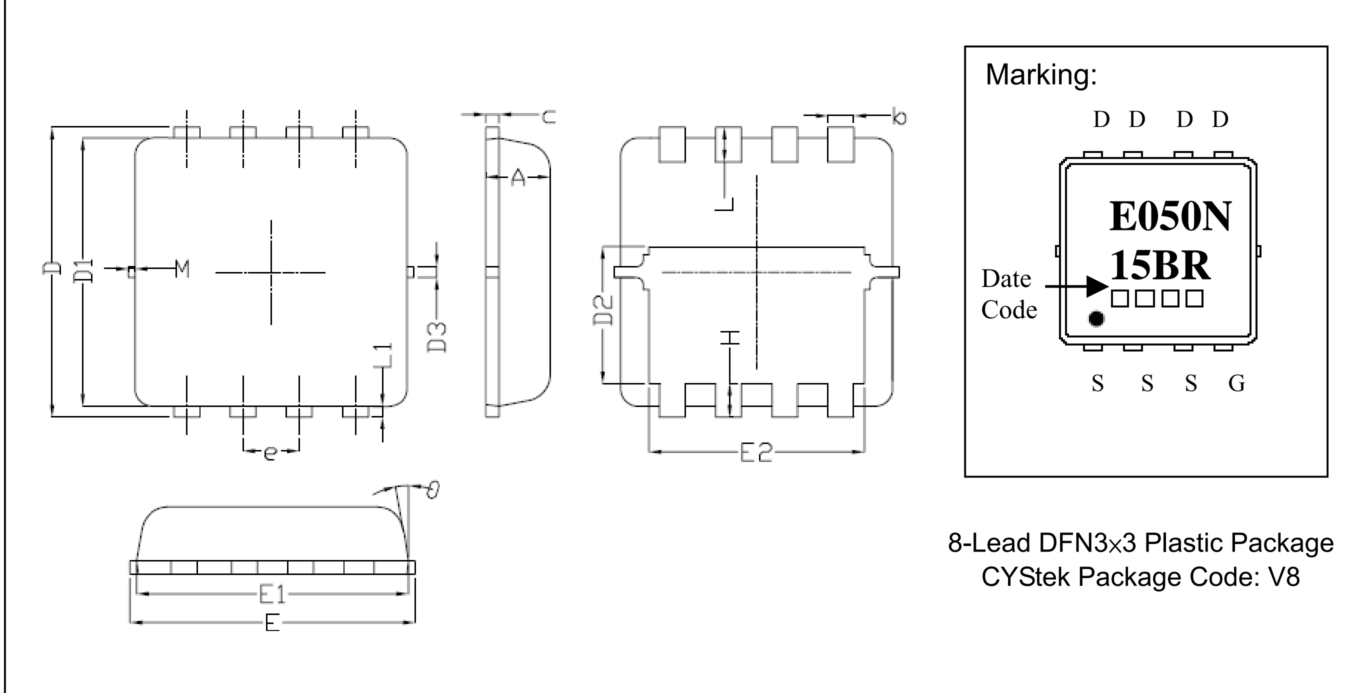
Recommended temperature profile for IR reflow



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 (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 :1. All temperatures refer to topside of the package, measured on the package body surface.
2. For devices mounted on FR-4 PCB of 1.6mm or equivalent grade PCB. If other grade PCB is used, care should be taken to match the coefficients of thermal expansion between components and PCB. If they are not matched well, the solder joints may crack or the bodies of the parts may crack or shatter as the assembly cools.

DFN3x3 Dimension



8-Lead DFN3x3 Plastic Package
CYStek Package Code: V8

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.70	0.80	0.028	0.031	E1	3.00	3.20	0.118	0.126
b	0.25	0.35	0.010	0.014	E2	2.39	2.59	0.094	0.102
c	0.10	0.25	0.004	0.010	e	0.65 BSC		0.026 BSC	
D	3.25	3.45	0.128	0.136	H	0.30	0.50	0.012	0.020
D1	3.00	3.20	0.118	0.126	L	0.30	0.50	0.012	0.020
D2	1.48	1.68	0.058	0.066	L1	0.13 TYP		0.005 TYP	
D3	0.13 TYP		0.005 TYP		θ	8°	12°	8°	12°
E	3.20	3.40	0.126	0.134	M	-	0.15	-	0.006

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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