N-Channel Enhancement Mode Power MOSFET

MTE100N10KRH8

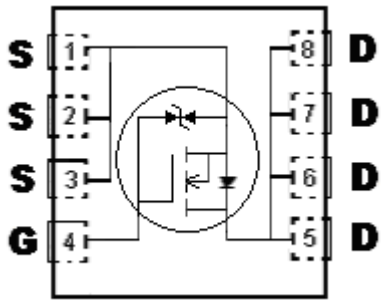
BV_{DSS}	**100V**
I_D@V_{GS}=10V, T_C=25°C	**6.8A**
I_D@V_{GS}=10V, T_A=25°C	**3.0A**
$R_{DS(ON)}$@V_{GS}=10V, I_D=2A	**102mΩ(typ)**

Features

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- ESD protected gate
- Pb-free lead plating and Halogen-free package

Symbol

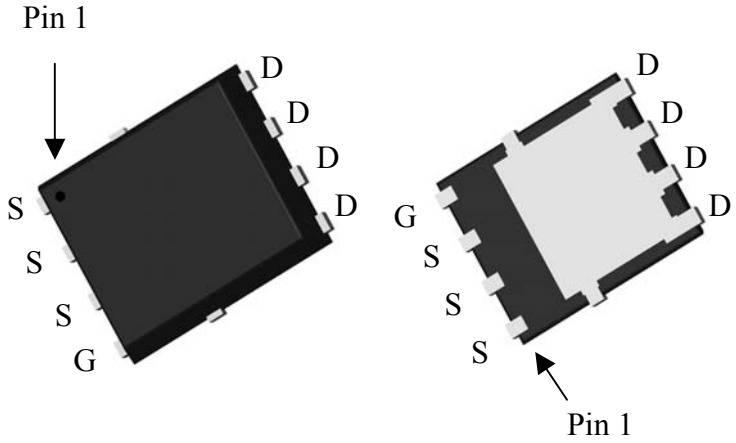
MTE100N10KRH8



G：Gate D：Drain S：Source

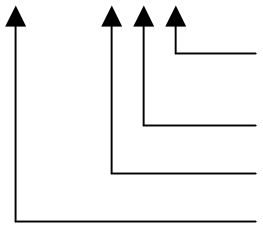
Outline

DFN5x6



Ordering Information

Device	Package	Shipping
MTE100N10KRH8-0-T6-G	DFN 5 x6 (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 (T_C=25°C, unless otherwise noted)

Parameter		Symbol	Limits	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current @T_C=25°C, V_{GS}=10V (Note 5)		I_D	6.8	A
Continuous Drain Current @T_C=100°C, V_{GS}=10V (Note 5)			4.3	
Continuous Drain Current @T_A=25°C, V_{GS}=10V (Note 2)		I_{DSM}	3	
Continuous Drain Current @T_A=70°C, V_{GS}=10V (Note 2)			2.4	
Pulsed Drain Current @ V_{GS}=10V (Note 3)		I_{DM}	23	
Avalanche Current @L=0.1mH (Note 3)		I_{AS}	16	
Body Diode Continuous Forward Current		I_S	6.8	
Single Pulse Avalanche Energy @ L=1mH, I_D=8Amps, V_{DD}=25V (Note 4)		E_{AS}	32	mJ
Repetitive Avalanche Energy (Note 3)		E_{AR}	1.3	
Power Dissipation	T_C=25°C (Note 1)	P_D	12.5	W
	T_C=100°C (Note 1)		5	
	T_A=25°C (Note 2)	P_{DSM}	2.5	
	T_A=70°C (Note 2)		1.6	
Operating Junction and Storage Temperature		Tj, Tstg	-55~+150	°C

*Drain current limited by maximum junction temperature

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	10	°C/W
Thermal Resistance, Junction-to-ambient, max (Note 2)	$R_{\theta JA}$	50	

Note : 1.The power dissipation P_D is based on $T_{J(MAX)}$=150°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 in² FR-4 board with 2 oz. copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The power dissipation P_{DSM} is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.

3. Pulse width limited by junction temperature $T_{J(MAX)}$=150°C.

4. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C. 100% tested by conditions of V_{DD}=25V, I_D=7A, L=100μH, V_{GS}=10V.

5. Calculated continuous drain current based on maximum allowable junction temperature.

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

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

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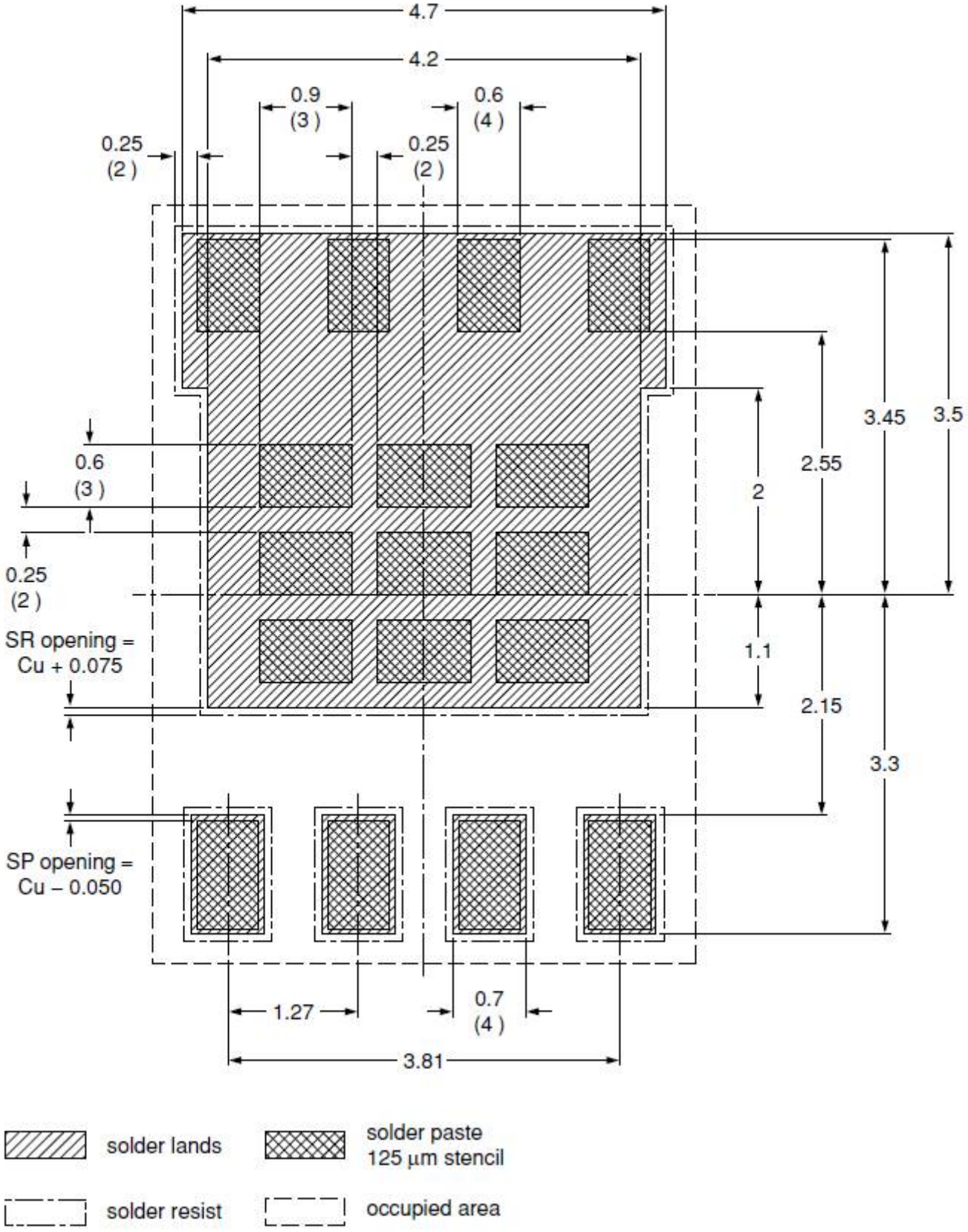
Characteristics (Tj=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.08	-	V/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	2	-	4	V	V_{DS} = V_{GS}, I_D=250μA
*G_{FS}	-	3.5	-	S	V_{DS} =10V, I_D=5A
I_{GSS}	-	-	±10	μA	V_{GS}=±16V, V_{DS}=0V
I_{DSS}	-	-	1		V_{DS} =80V, V_{GS} =0V
	-	-	5		V_{DS} =80V, V_{GS} =0V, Tj=55°C
*$R_{DS(ON)}$	-	102	135	mΩ	V_{GS} =10V, I_D=2A
Dynamic					
*Qg	-	5.7	8.6	nC	V_{DS}=80V, I_D=2A, V_{GS}=10V
*Qgs	-	1.6	-		
*Qgd	-	1.1	-		
*$t_{d(ON)}$	-	6.2	-	ns	V_{DS}=50V, I_D=2A, V_{GS}=10V, R_G=1Ω
*tr	-	17.2	-		
*$t_{d(OFF)}$	-	12.8	-		
*t_f	-	5.6	-		
Ciss	-	257	386	pF	V_{GS}=0V, V_{DS}=50V, f=1MHz
Coss	-	34	-		
Crss	-	6	-		
Rg	-	6.7	-	Ω	f=1MHz
Source-Drain Diode					
*I_S	-	-	6.8	A	
*I_{SM}	-	-	23		
*V_{SD}	-	0.82	1.2	V	I_S=2A, V_{GS}=0V
*trr	-	17	-	ns	V_{GS}=0V, I_F=2A, dI_F/dt=100A/μs
*Qrr	-	12.8	-	nC	

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

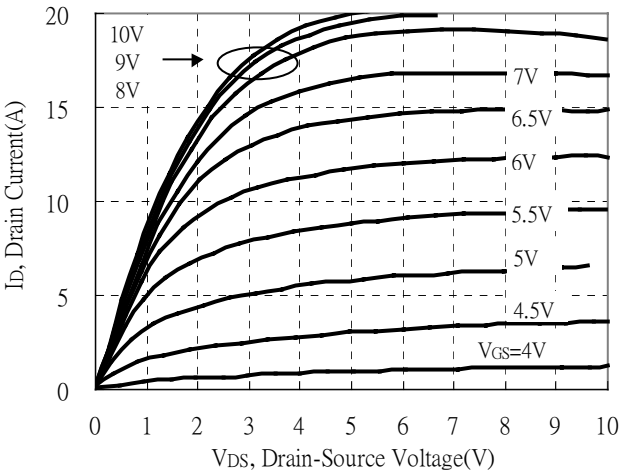
Recommended Soldering Footprint & Stencil Design



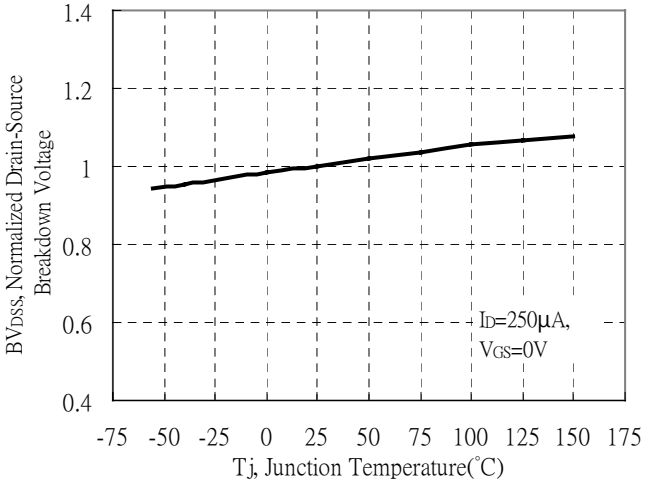
unit : mm

Typical Characteristics

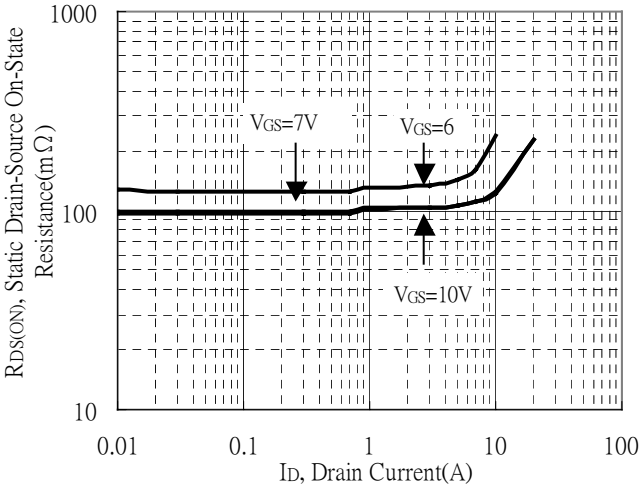
Typical Output Characteristics



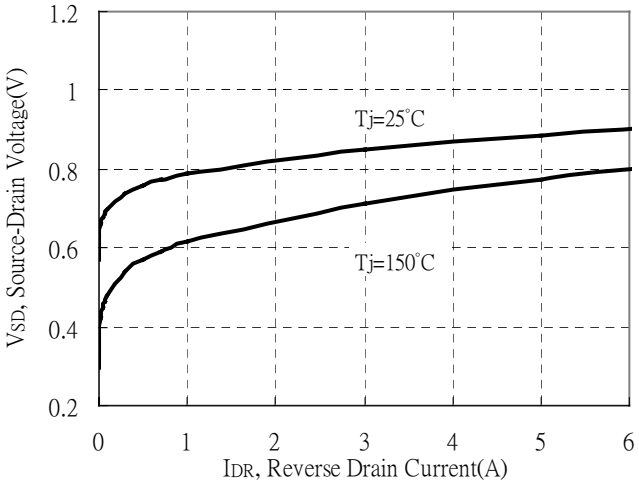
Brekdown Voltage vs Ambient Temperature



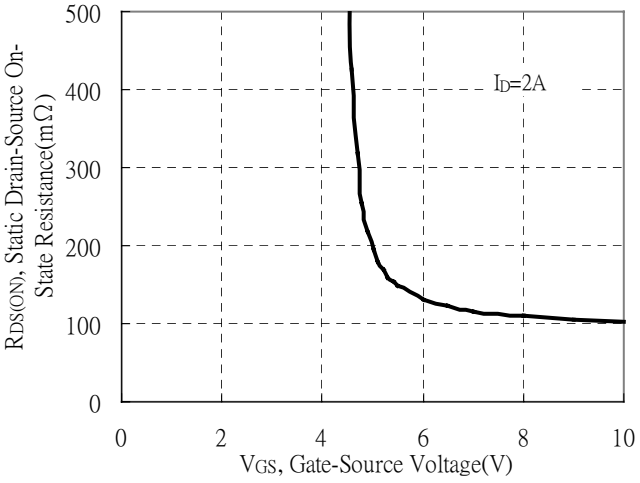
Static Drain-Source On-State resistance vs Drain Current



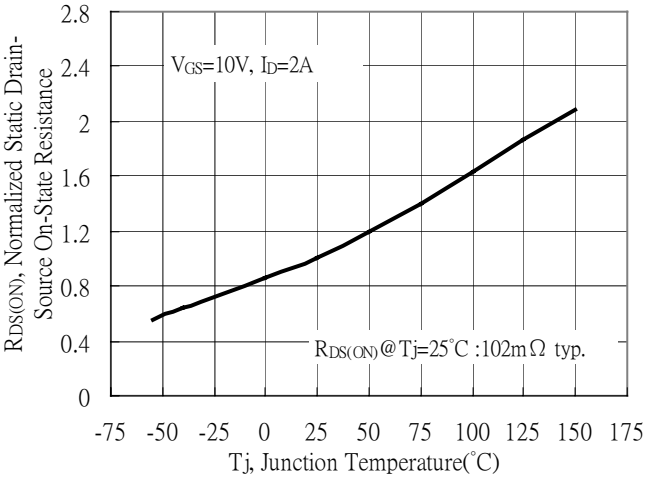
Reverse Drain Current vs Source-Drain Voltage



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

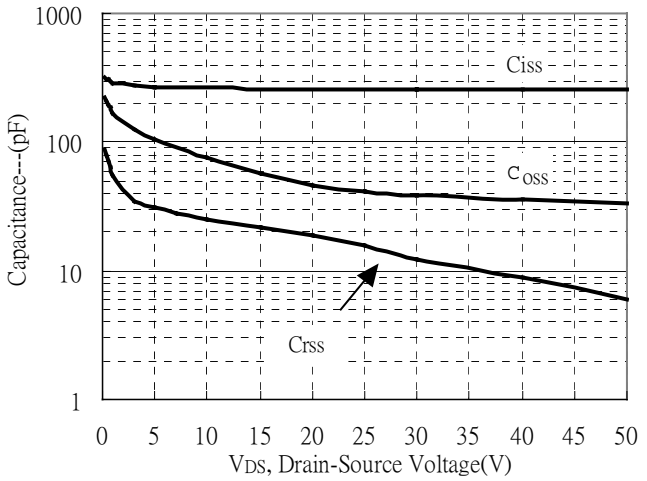


Drain-Source On-State Resistance vs Junction Tempearture

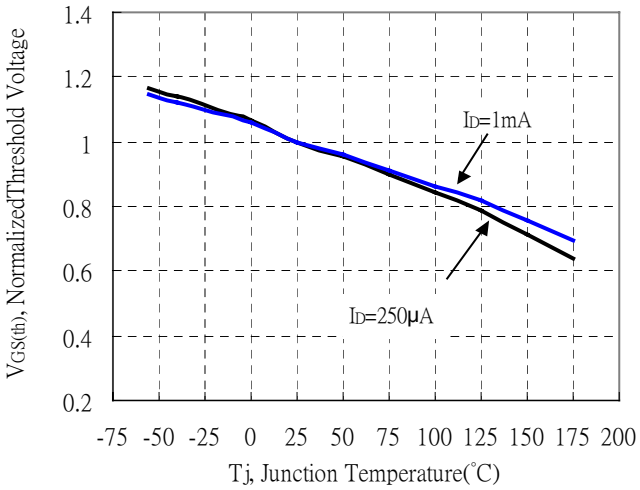


Typical Characteristics(Cont.)

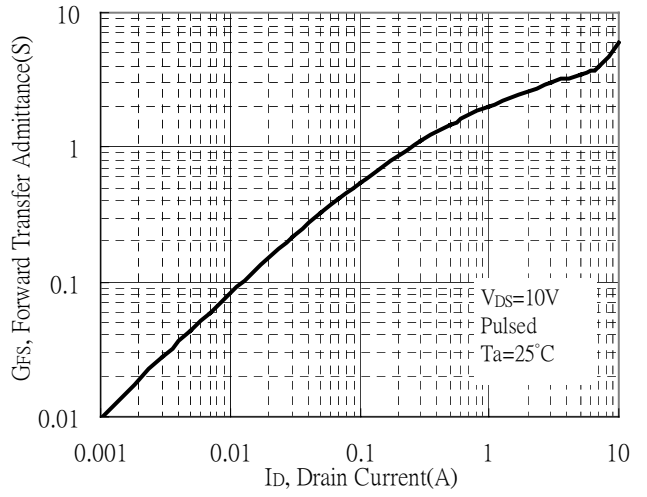
Capacitance vs Drain-to-Source Voltage



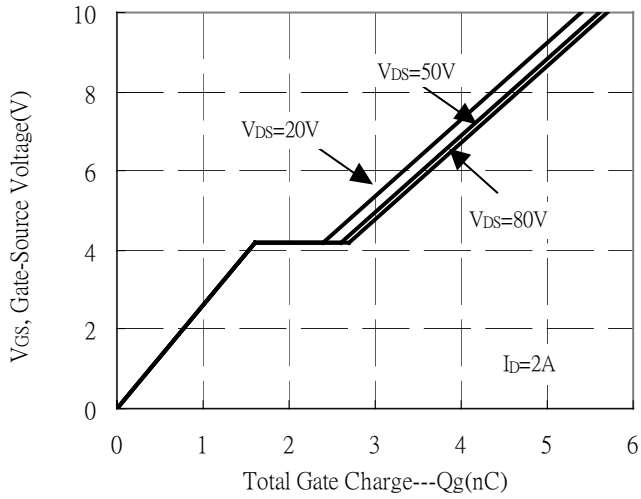
Threshold Voltage vs Junction Tempearture



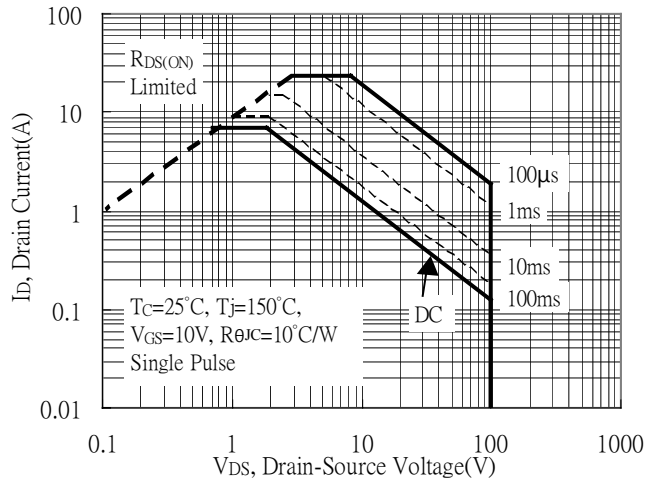
Forward Transfer Admittance vs Drain Current



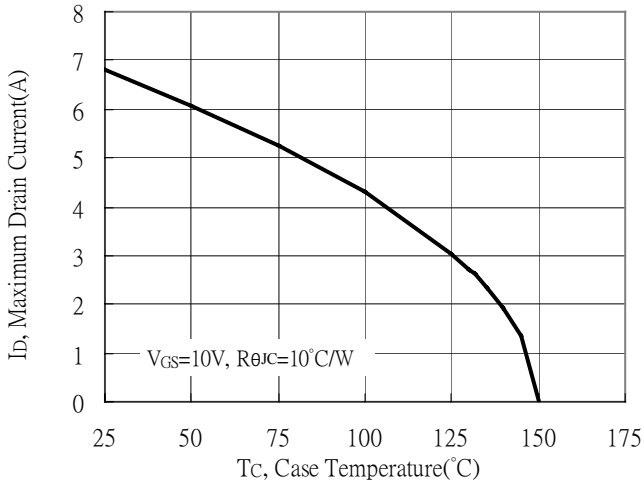
Gate Charge Characteristics



Maximum Safe Operating Area

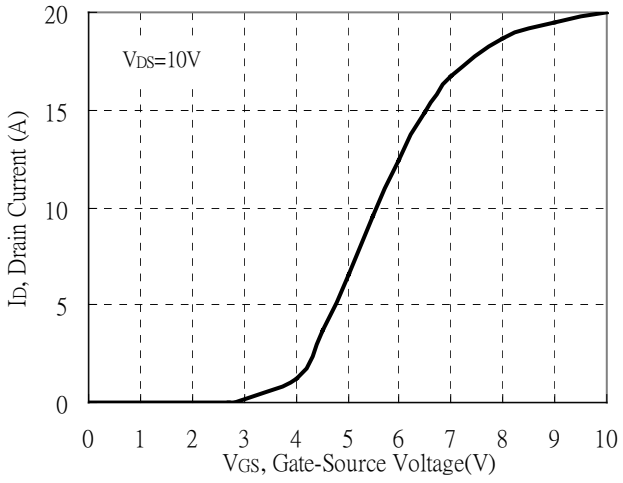


Maximum Drain Current vs Case Temperature

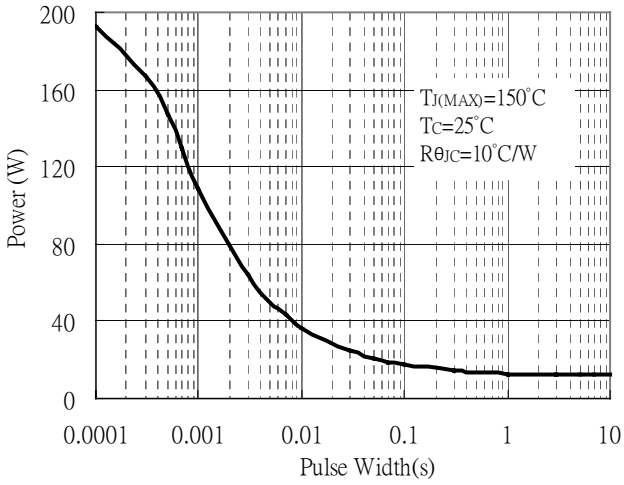


Typical Characteristics(Cont.)

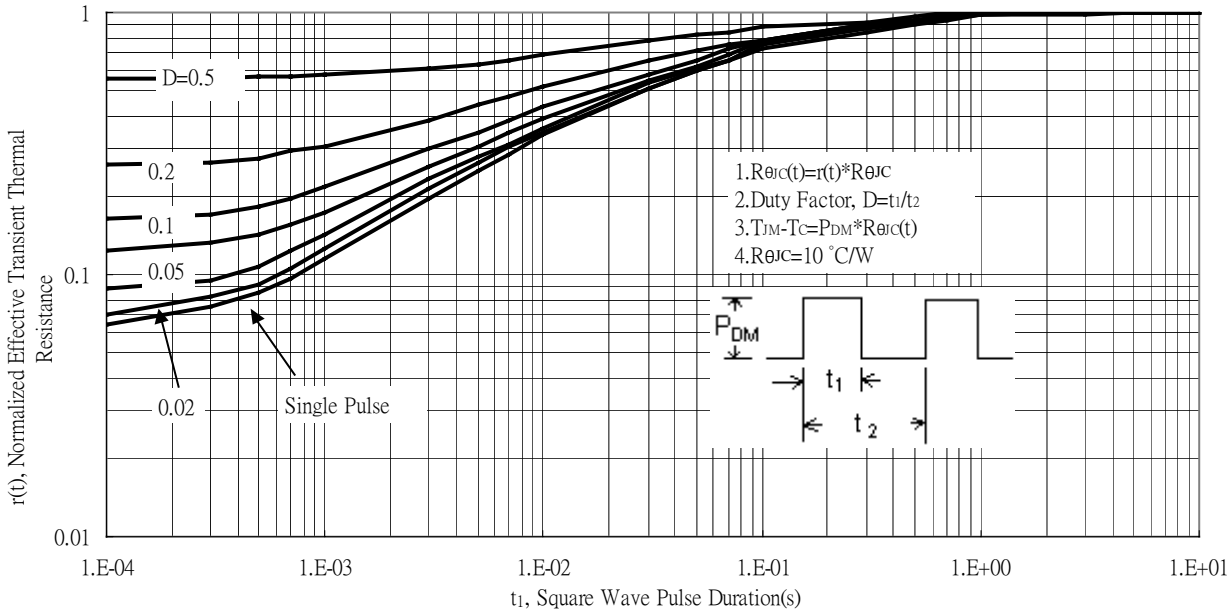
Typical Transfer Characteristics



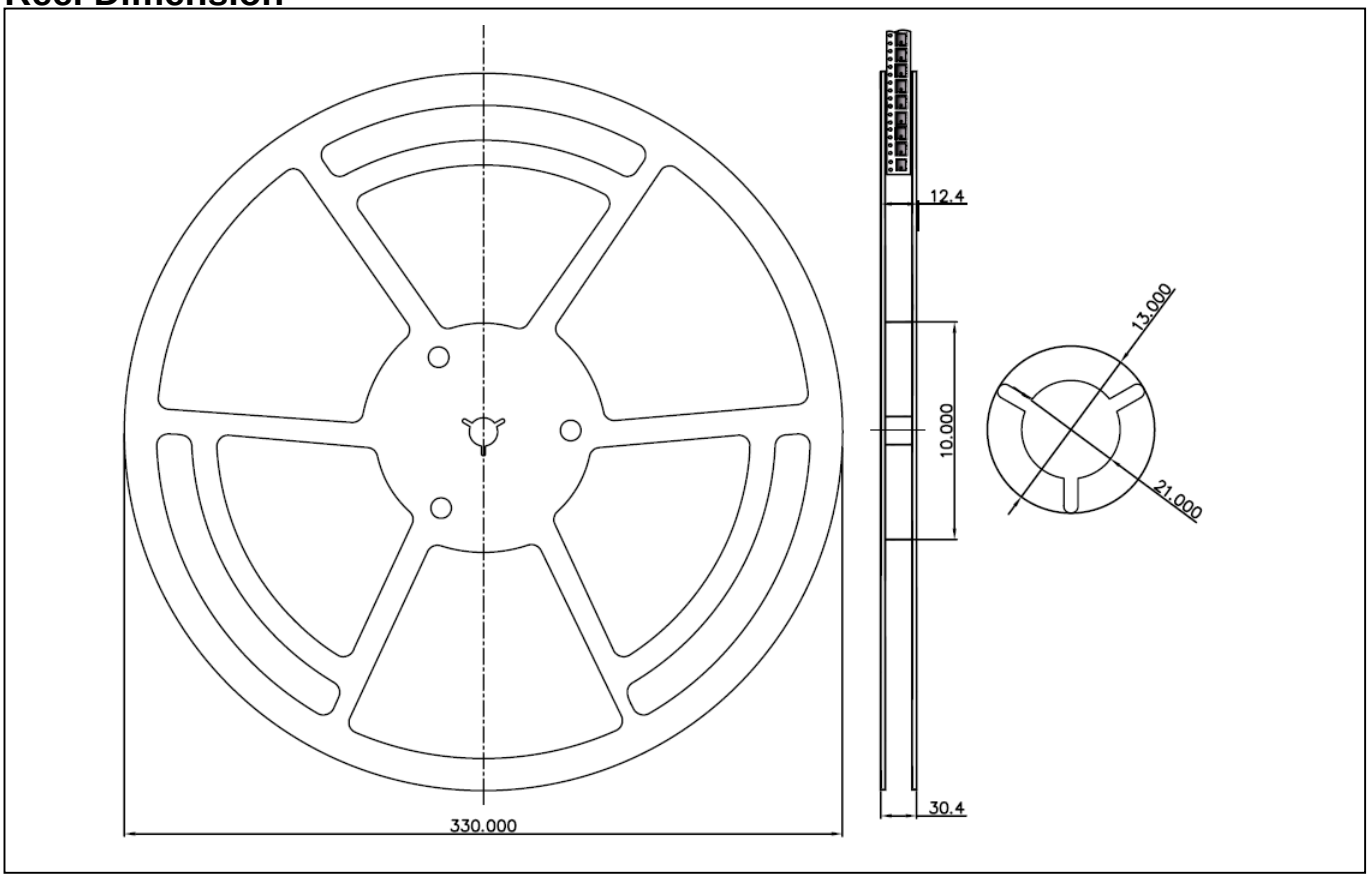
Single Pulse Maximum Power Dissipation



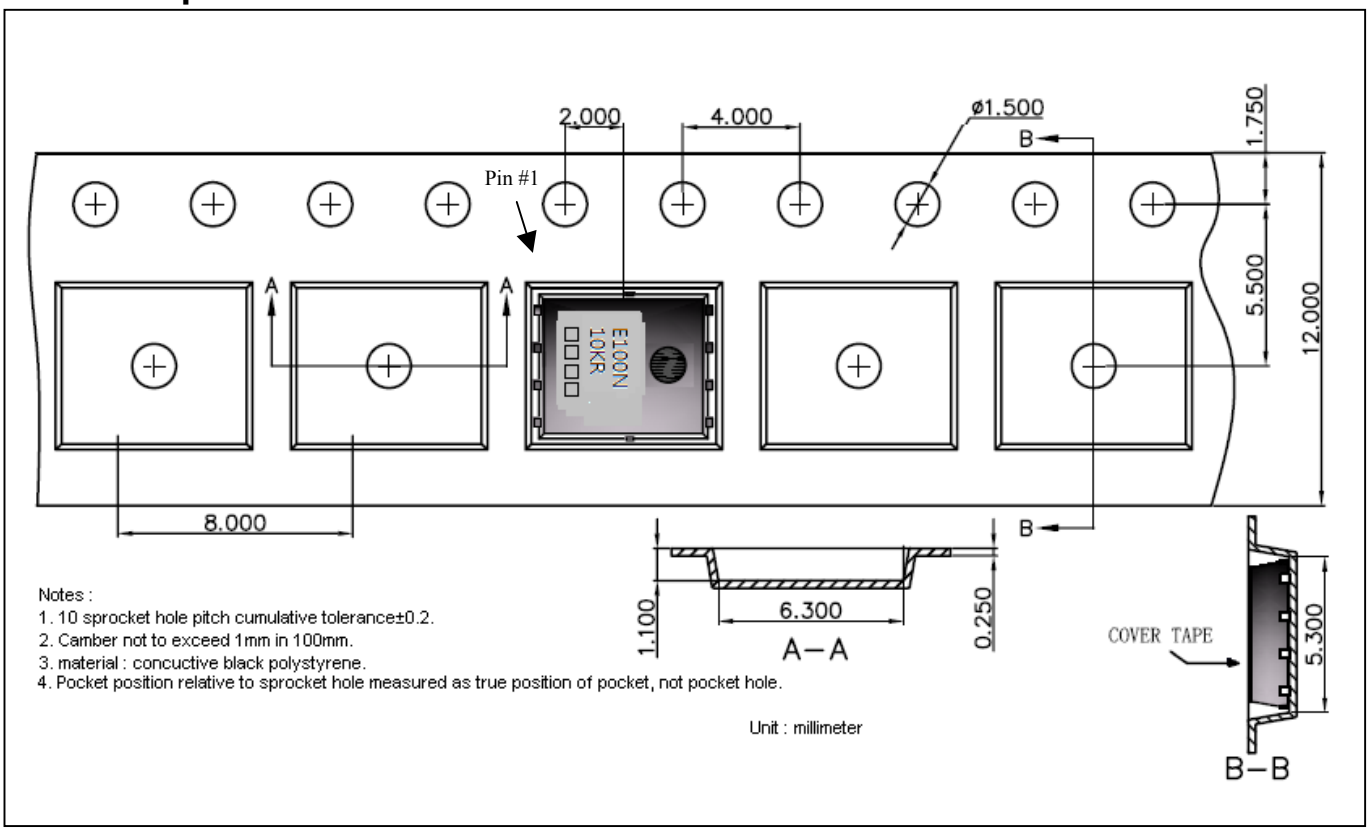
Transient Thermal Response Curves



Reel Dimension



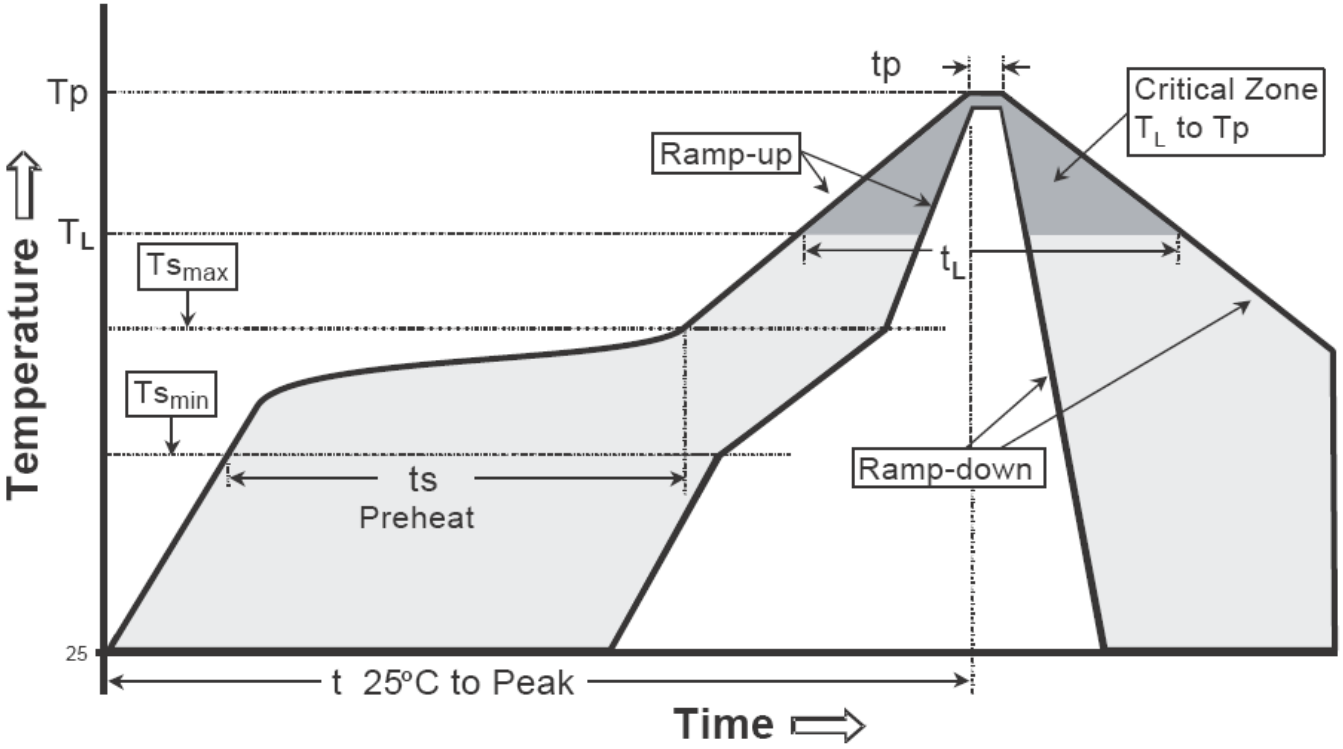
Carrier Tape Dimension



Recommended wave soldering condition

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

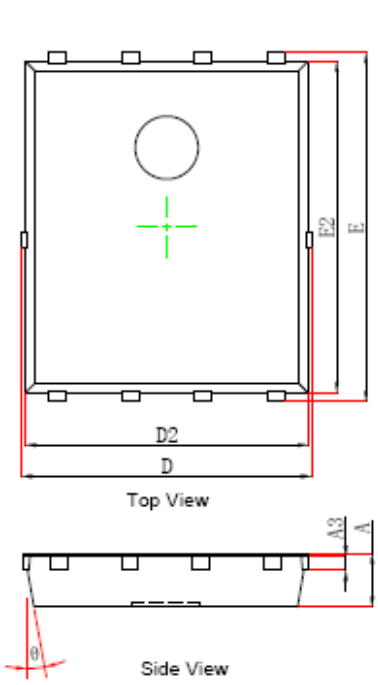
Recommended temperature profile for IR reflow

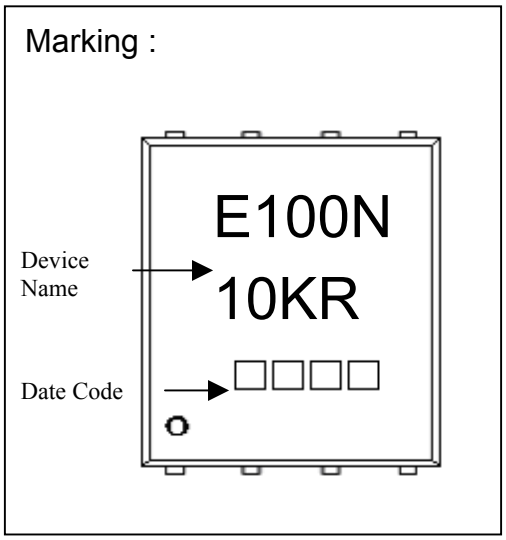


Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(T_S min) −Temperature Max(T_S max) −Time($t_{s\ min}$ to $t_{s\ max}$)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature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

DFN5x6 Dimension





8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039	k	1.190	1.390	0.047	0.055
A3	0.254 REF		0.010 REF		b	0.350	0.450	0.014	0.018
D	4.944	5.096	0.195	0.201	e	1.270 TYP.		0.050 TYP.	
E	5.974	6.126	0.235	0.241	L	0.559	0.711	0.022	0.028
D1	3.910	4.110	0.154	0.162	L1	0.424	0.576	0.017	0.023
E1	3.375	3.575	0.133	0.141	H	0.574	0.726	0.023	0.029
D2	4.824	4.976	0.190	0.196	θ	10°	12°	10°	12°
E2	5.674	5.826	0.223	0.229					

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.