30V Dual Asymmetric N-Channel Enhancement Mode MOSFET

MTNN080603RSV8A

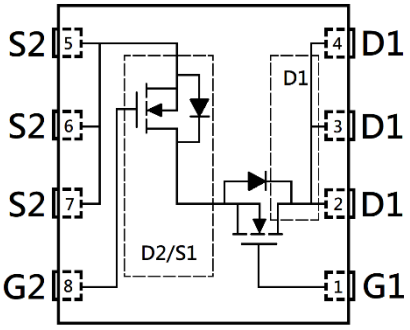
Features

- High Current Capability
- Low On Resistance
- Fast Switching Characteristic
- Low Gate Charge
- RoHS compliant package

	Q1	Q2
BV_{DSS}	30V	30V
I_D@V_{GS}=10V, T_C=25°C	20A	30A
I_D@V_{GS}=10V, T_A=25°C	12A	15A
$R_{DS(ON)}$ typ. @ V_{GS}=10V	7.3mΩ	5mΩ
$R_{DS(ON)}$ typ. @ V_{GS}=4.5V	11.5mΩ	7.5mΩ

Equivalent Circuit

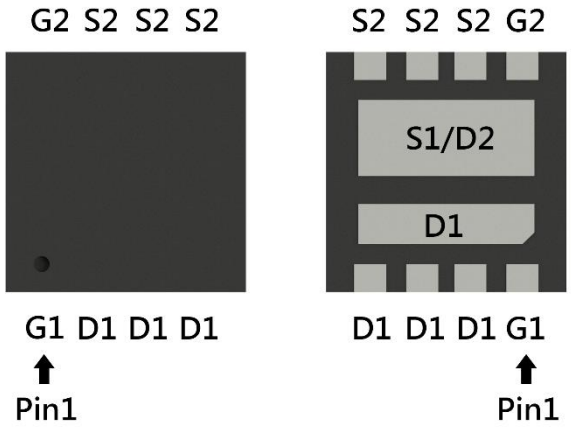
MTNN080603RSV8A



D2 and S1 are connected to the bottom side

Outline

DFN3x3A



Ordering Information

Device	Package	Shipping
MTNN080603RSV8A-0-T6-G	DFN3×3A (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_A=25°C)

Parameter		Symbol	Limits		Unit
			Q1	Q2	
Drain-Source Voltage		V_{DS}	30	30	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current @ V_{GS}=10V, T_C=25°C (silicon limit)	*a	I_D	45	56	A
Continuous Drain Current @ V_{GS}=10V, T_C=25°C (package limit)	*a		20	30	
Continuous Drain Current @ V_{GS}=10V, T_C=100°C	*a		20	30	
Continuous Drain Current @ V_{GS}=10V, T_A=25°C	*b		12	15	
Continuous Drain Current @ V_{GS}=10V, T_A=70°C	*b		9.6	12	
Pulsed Drain Current	*c	I_{DM}	80	120	
Continuous Body Diode Forward Current @ T_C=25°C	*a	I_S	20	30	
Pulsed Body Diode Forward Current @ T_C=25°C	*a	I_{SM}	80	120	
Avalanche Current @ L=0.1mH		I_{AS}	13	15	
Avalanche Energy @ L=0.5mH		E_{AS}	12	16	mJ
Total Power Dissipation	T_C=25°C *a	P_D	33	37	W
	T_C=100°C *a		13	15	
	T_A=25°C *b		2.2	2.5	
	T_A=70°C *b		1.4	1.6	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150		°C

Thermal Data

Parameter		Symbol	Steady State		Unit
Thermal Resistance, Junction-to-case		$R_{\theta JC}$	3.8	3.4	°C/W
Thermal Resistance, Junction-to-ambient	*b	$R_{\theta JA}$	57	50	

Note:

*a. 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.

*b. 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 power dissipation P_D is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

*c. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to keep initial T_J=25°C.

Q1 Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	2.5		V_{DS}=V_{GS}, I_D=250μA
G_{FS}	-	12	-	S	V_{DS}=5V, I_D=10A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
$R_{DS(ON)}$	-	7.3	9.5	mΩ	V_{GS}=10V, I_D=12A
	-	11.5	16		V_{GS}=4.5V, I_D=9A
Dynamic					
Ciss	-	580	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Coss	-	410	-		
Crss	-	55	-		
Rg	-	0.7	-	Ω	f=1MHz
Qg *1, 2	-	10.5	-	nC	V_{DS}=15V, I_D=10A, V_{GS}=10V
Qgs *1, 2	-	2.1	-		
Qgd *1, 2	-	2	-		
$t_{d(ON)}$ *1, 2	-	6.7	-	ns	V_{DS}=15V, I_D=10A, V_{GS}=10V, R_{GS}=1Ω
tr *1, 2	-	13	-		
$t_{d(OFF)}$ *1, 2	-	20	-		
t_f *1, 2	-	5.5	-		
Source-Drain Diode					
V_{SD} *1	-	0.85	1.2	V	I_S=10A, V_{GS}=0V
trr	-	15	-	ns	I_F=10A, dI_F/dt=100A/μs
Qrr	-	4	-	nC	

Note:

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

*2. Independent of operating temperature

Q2 Electrical Characteristics (T_A=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$V_{GS(th)}$	1	-	2.5		V_{DS}=V_{GS}, I_D=250μA
G_{FS}	-	15.3	-	S	V_{DS}=5V, I_D=15A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
$R_{DS(ON)}$	-	5	6.5	mΩ	V_{GS}=10V, I_D=15A
	-	7.5	10.5		V_{GS}=4.5V, I_D=10A
Dynamic					
Ciss	-	750	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Coss	-	520	-		
Crss	-	65	-		
Rg	-	0.7	-	Ω	f=1MHz
Qg *1, 2	-	14	-	nC	V_{DS}=15V, I_D=15A, V_{GS}=10V
Qgs *1, 2	-	3	-		
Qgd *1, 2	-	3	-		
$t_{d(ON)}$ *1, 2	-	9	-	ns	V_{DS}=15V, I_D=15A, V_{GS}=10V, R_{GS}=1Ω
tr *1, 2	-	12.5	-		
$t_{d(OFF)}$ *1, 2	-	24	-		
t_f *1, 2	-	6	-		
Source-Drain Diode					
V_{SD} *1	-	0.83	1.2	V	I_S=10A, V_{GS}=0V
trr	-	19	-	ns	I_F=10A, dI_F/dt=100A/μs
Qrr	-	7	-	nC	

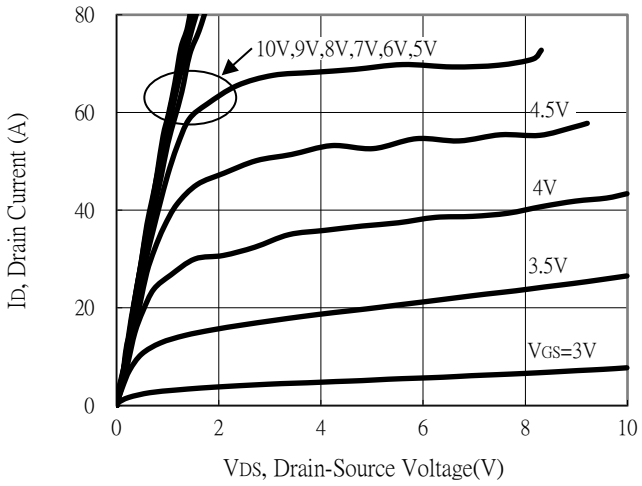
Note:

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

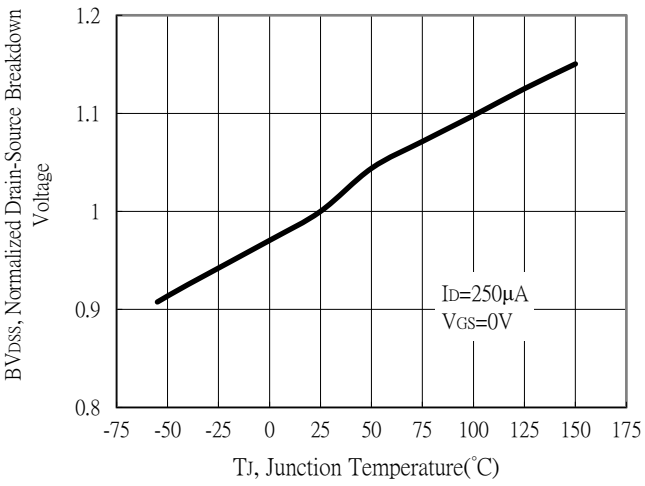
*2. Independent of operating temperature

Typical Characteristics : Q1(N-channel)

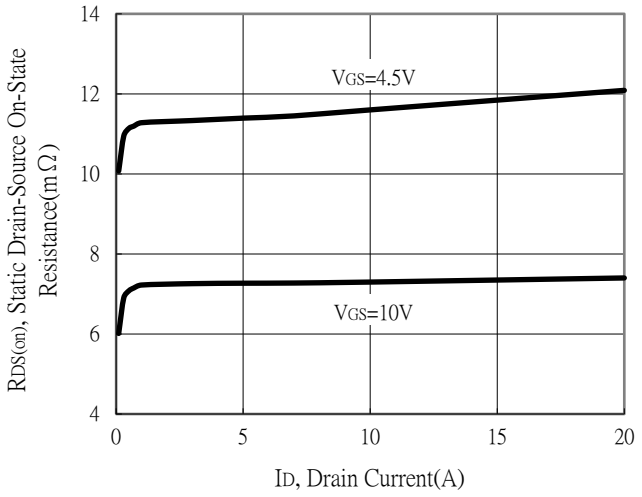
Typical Output Characteristics



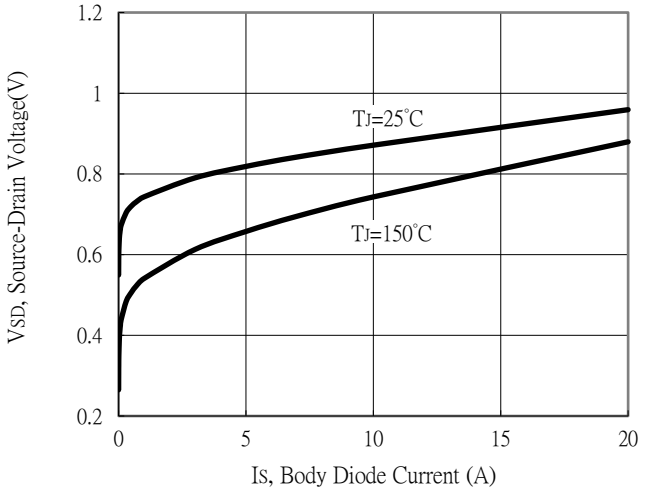
Breakdown Voltage vs Ambient Temperature



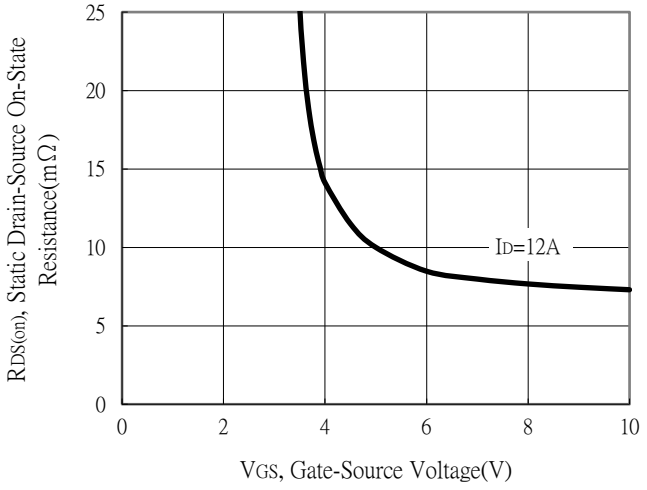
Static Drain-Source On-State resistance vs Drain Current



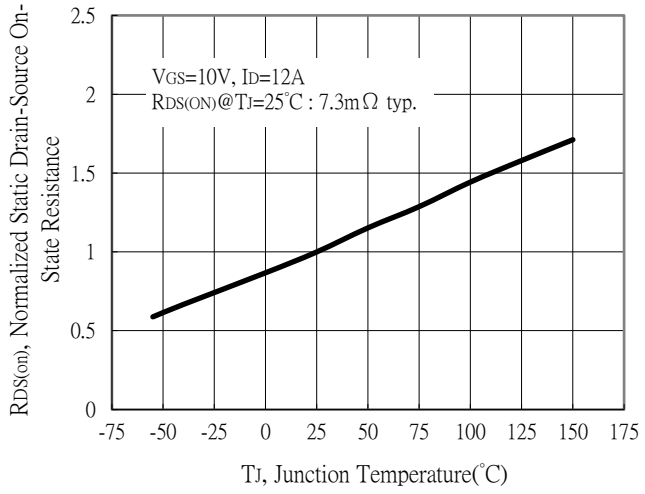
Body Diode Current vs Source-Drain Voltage



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

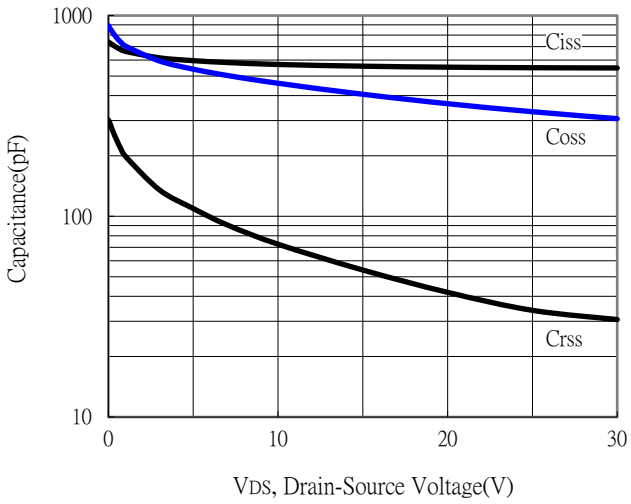


Drain-Source On-State Resistance vs Junction Temperature

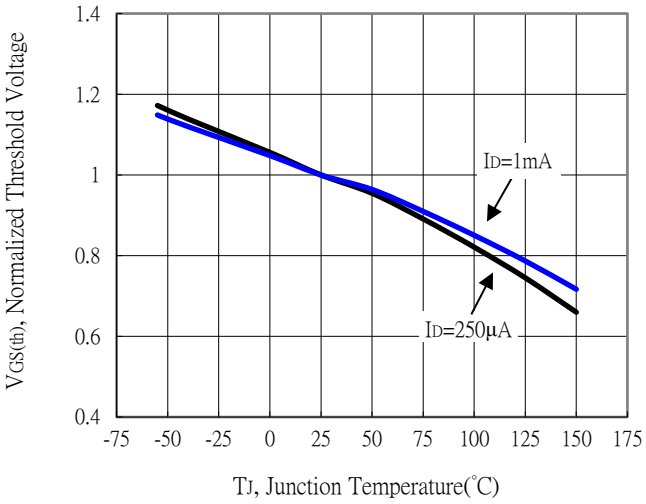


Typical Characteristics (Cont.) : Q1(N-channel)

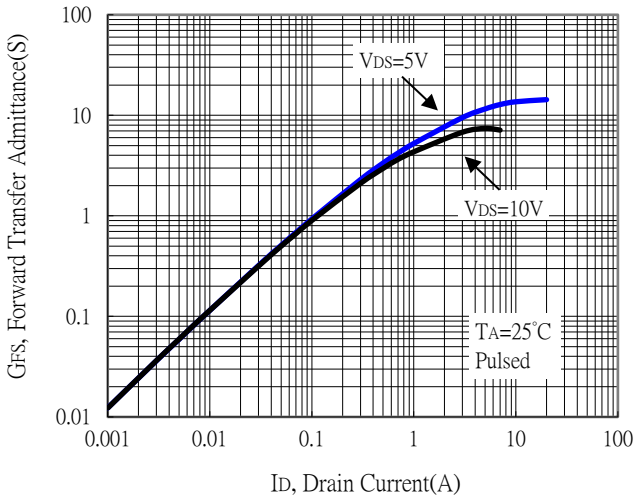
Capacitance vs Drain-to-Source Voltage



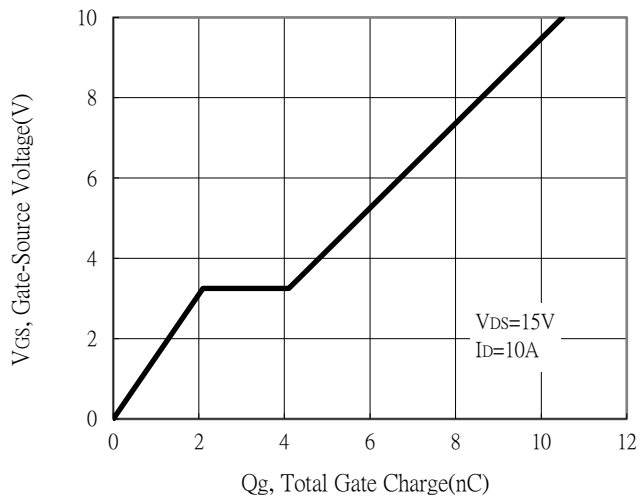
Threshold Voltage vs Junction Temperature



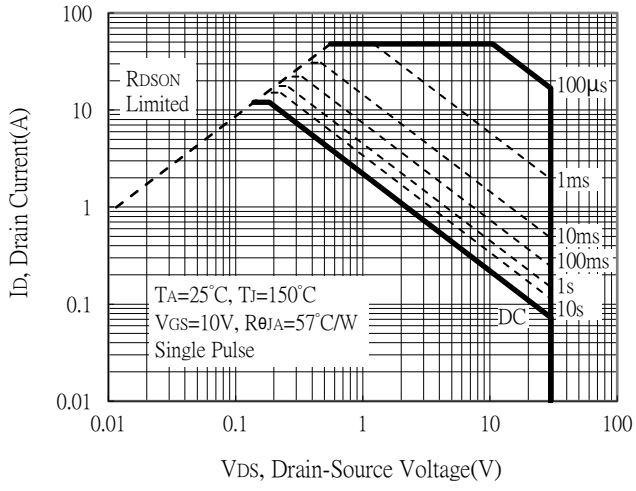
Forward Transfer Admittance vs Drain Current



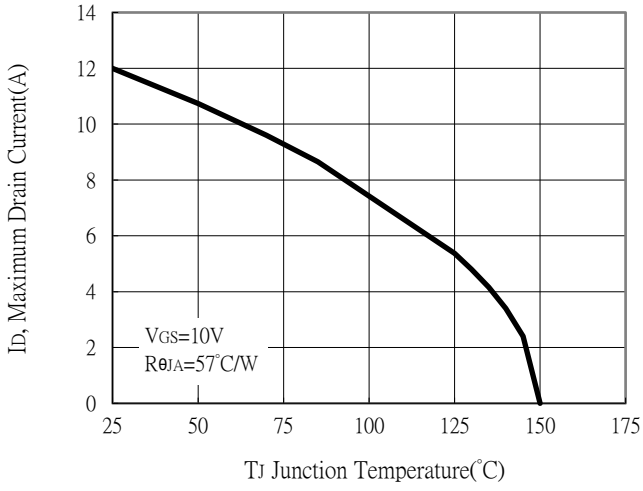
Gate Charge Characteristics



Maximum Safe Operating Area

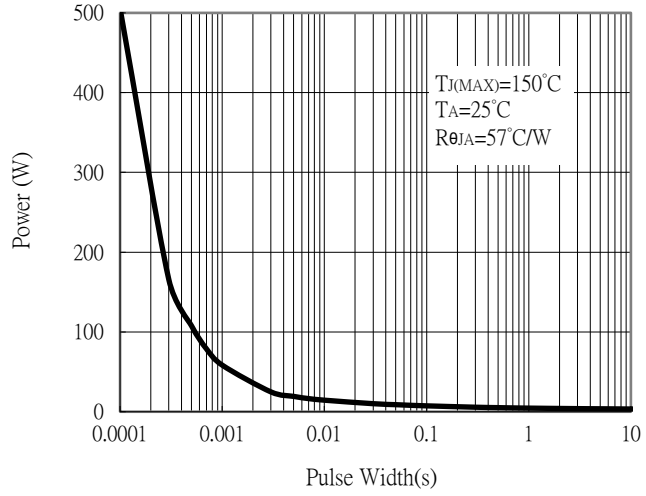


Maximum Drain Current vs Junction Temperature

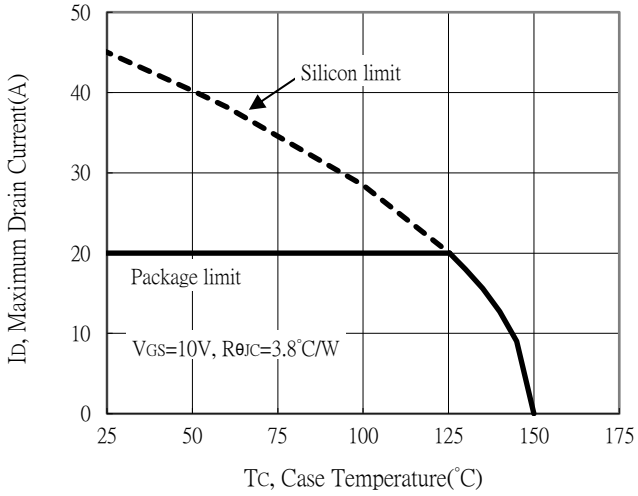


Typical Characteristics (Cont.) : Q1(N-channel)

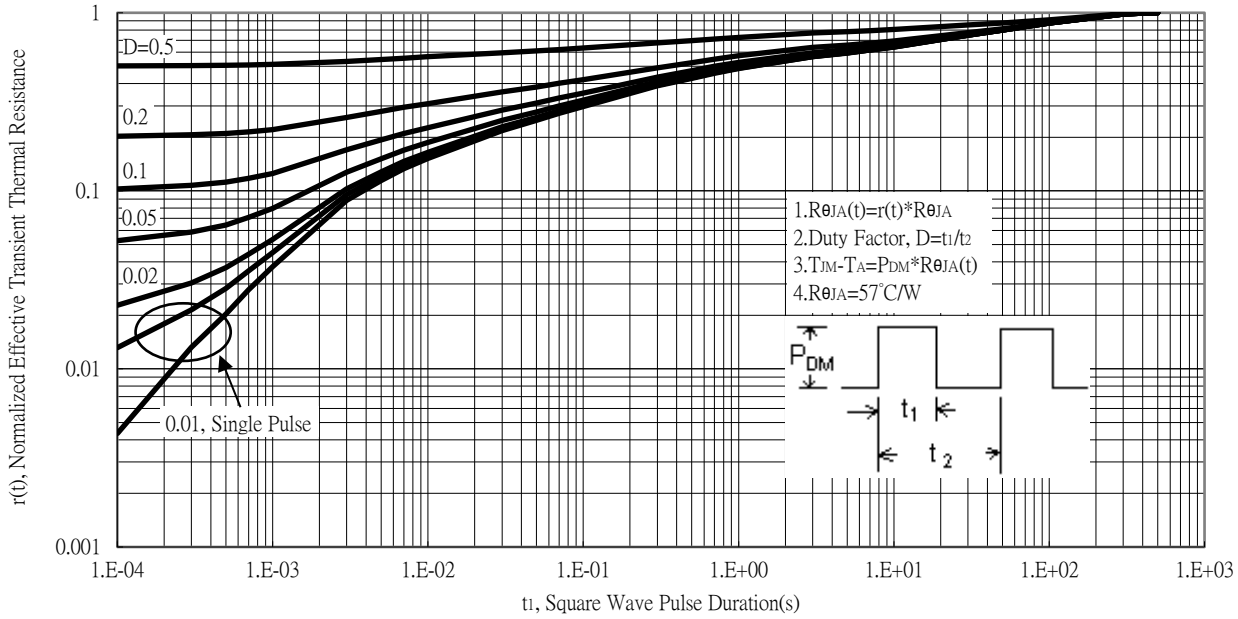
Single Pulse Power Rating, Junction to Ambient



Maximum Drain Current vs Case Temperature

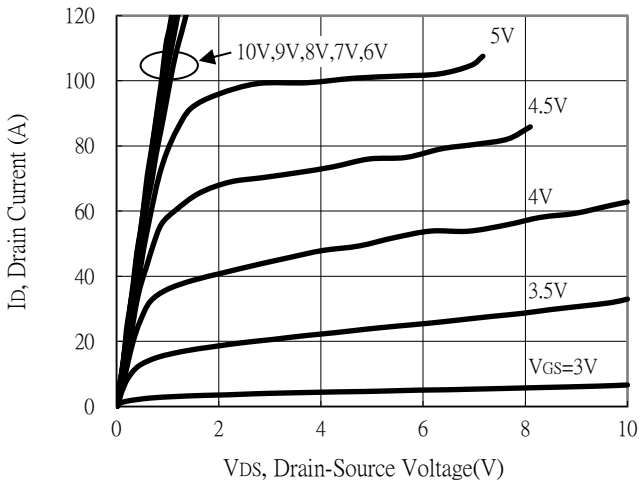


Transient Thermal Response Curves

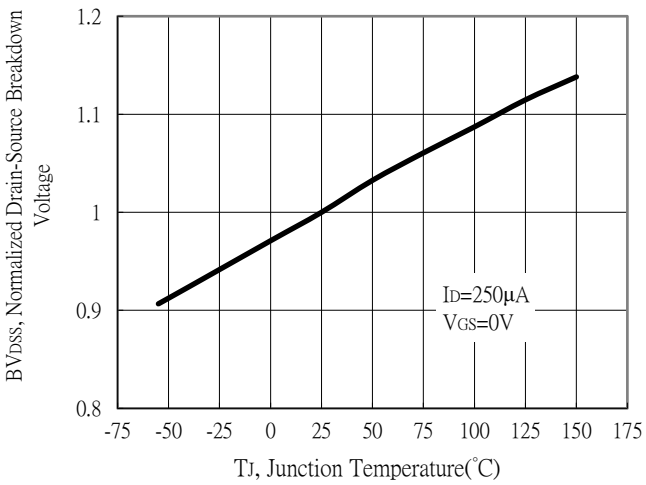


Typical Characteristics : Q2(N-channel)

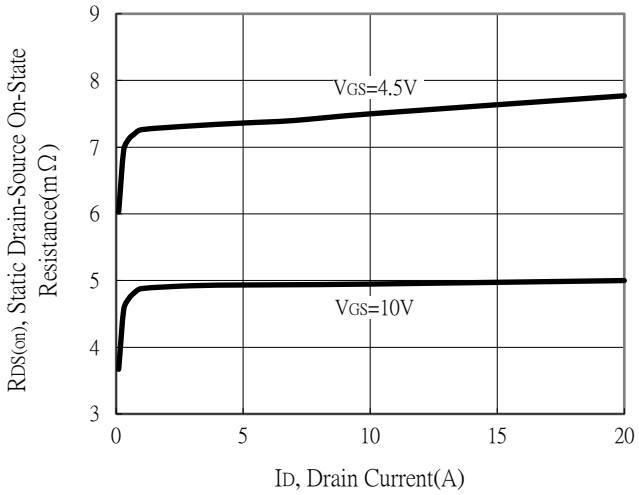
Typical Output Characteristics



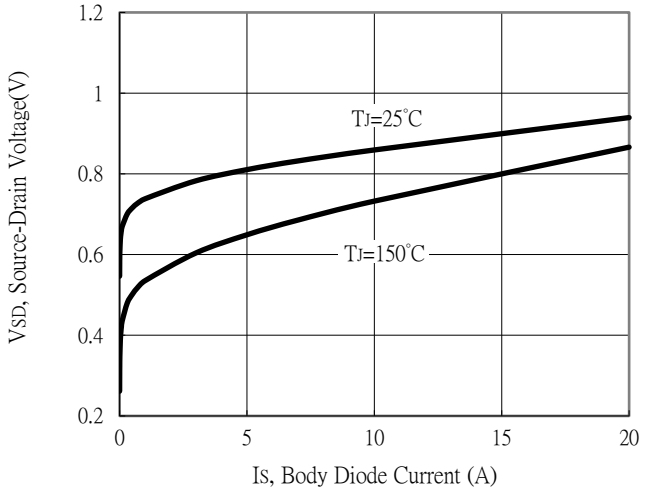
Breakdown Voltage vs Ambient Temperature



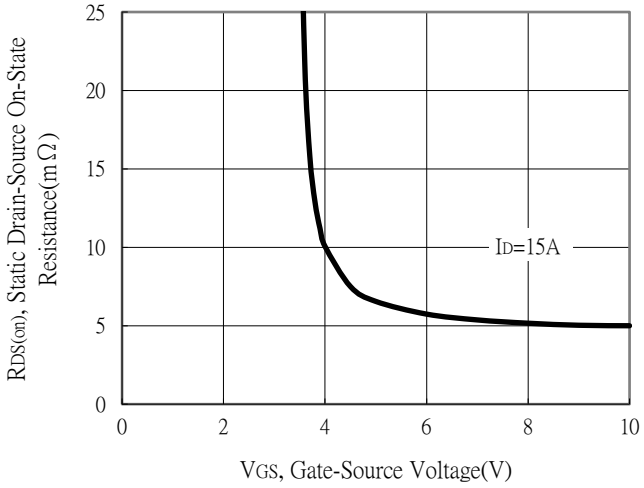
Static Drain-Source On-State resistance vs Drain Current



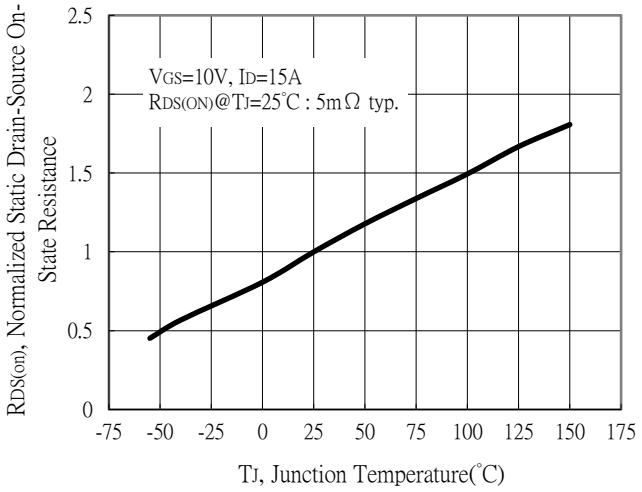
Body Diode Current vs Source-Drain Voltage



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

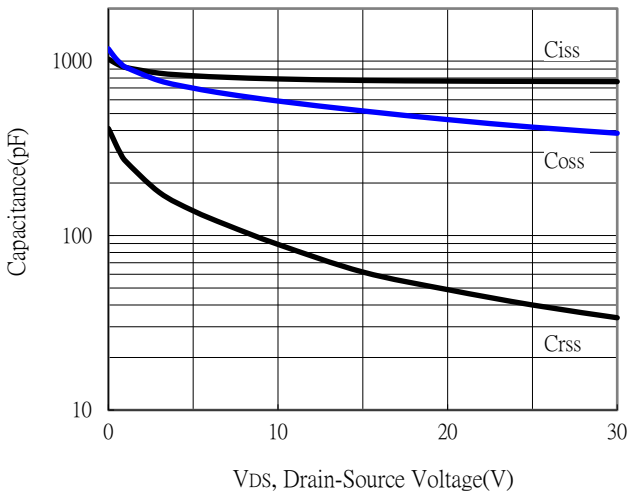


Drain-Source On-State Resistance vs Junction Temperature

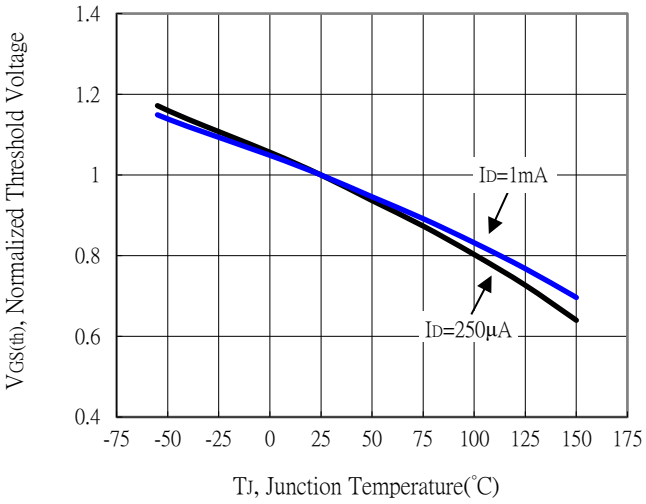


Typical Characteristics (Cont.) : Q2(N-channel)

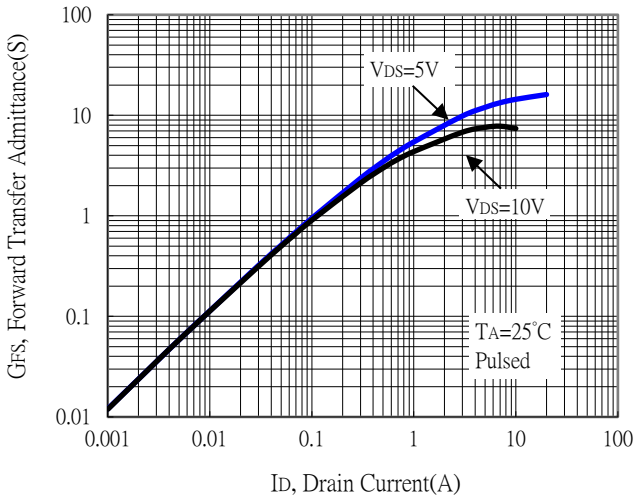
Capacitance vs Drain-to-Source Voltage



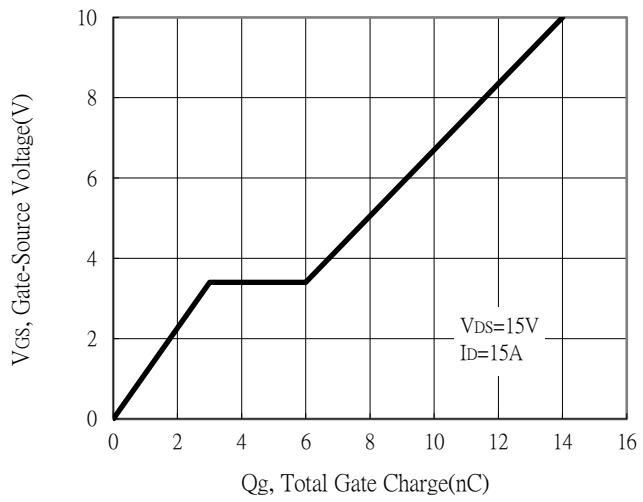
Threshold Voltage vs Junction Temperature



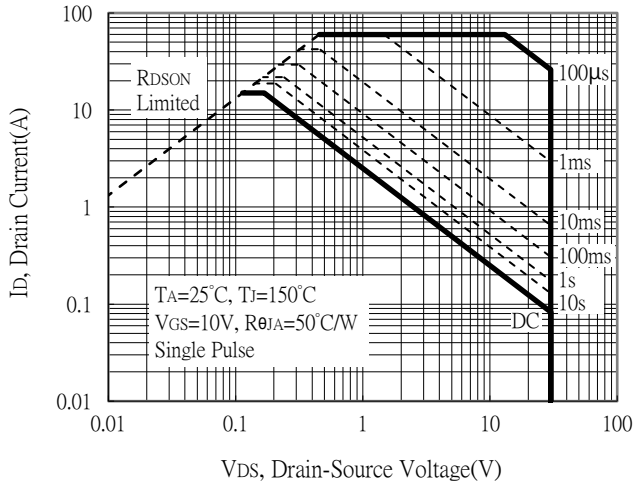
Forward Transfer Admittance vs Drain Current



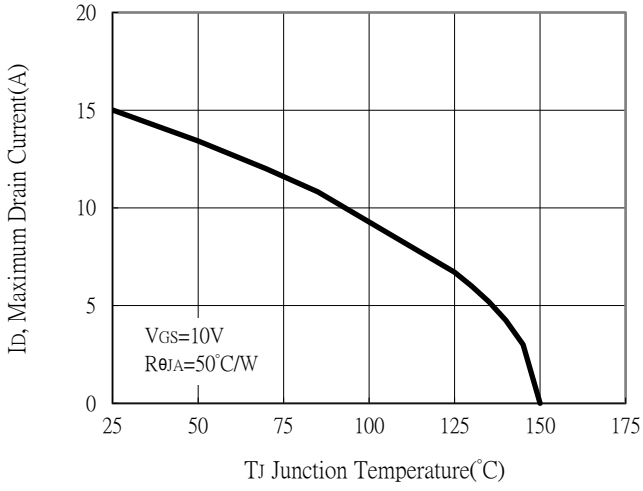
Gate Charge Characteristics



Maximum Safe Operating Area

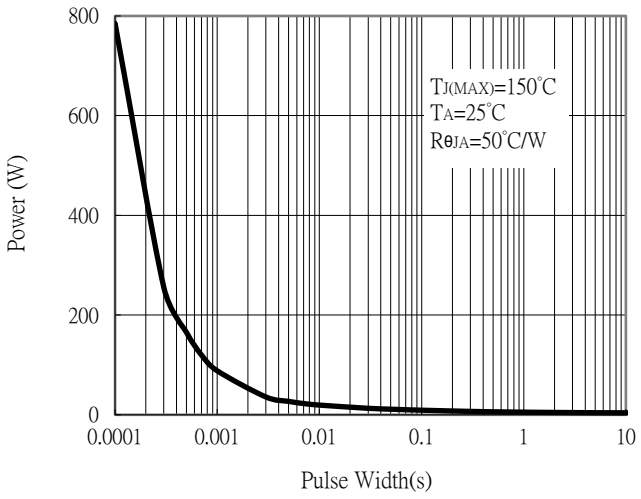


Maximum Drain Current vs Junction Temperature

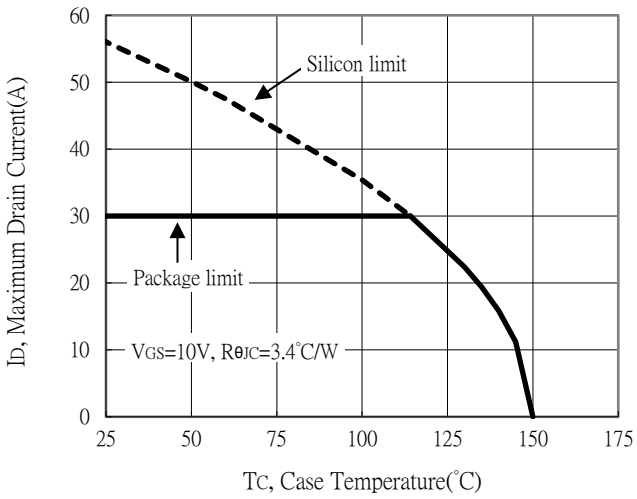


Typical Characteristics (Cont.) : Q2(P-channel)

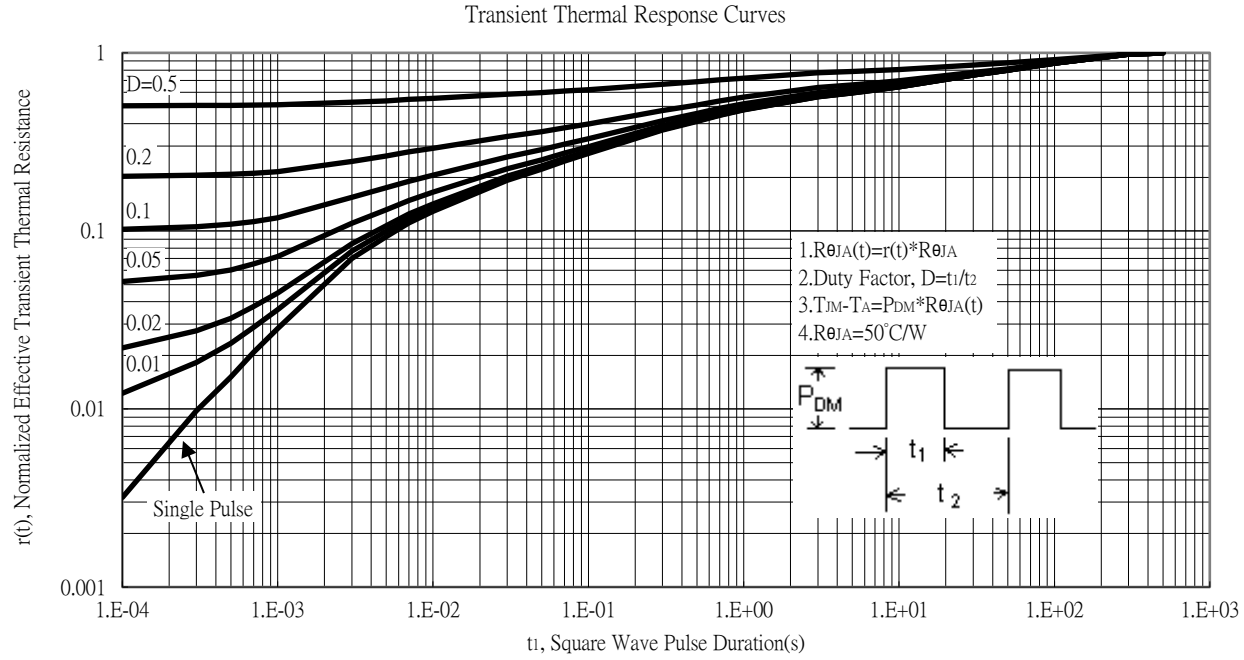
Single Pulse Power Rating, Junction to Ambient



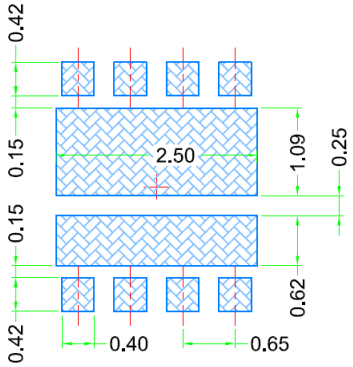
Maximum Drain Current vs Case Temperature



Transient Thermal Response Curves

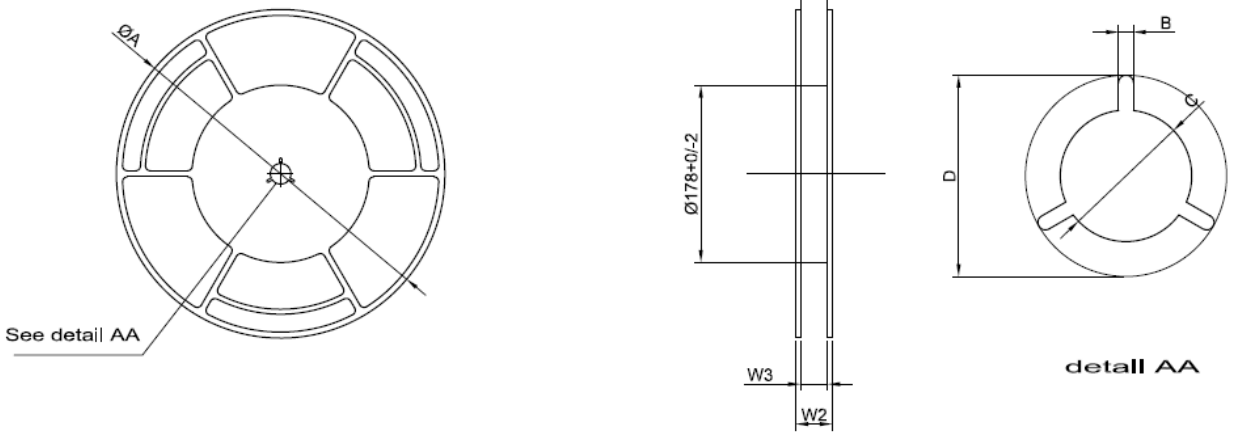


Recommended Soldering Footprint



Unit：mm

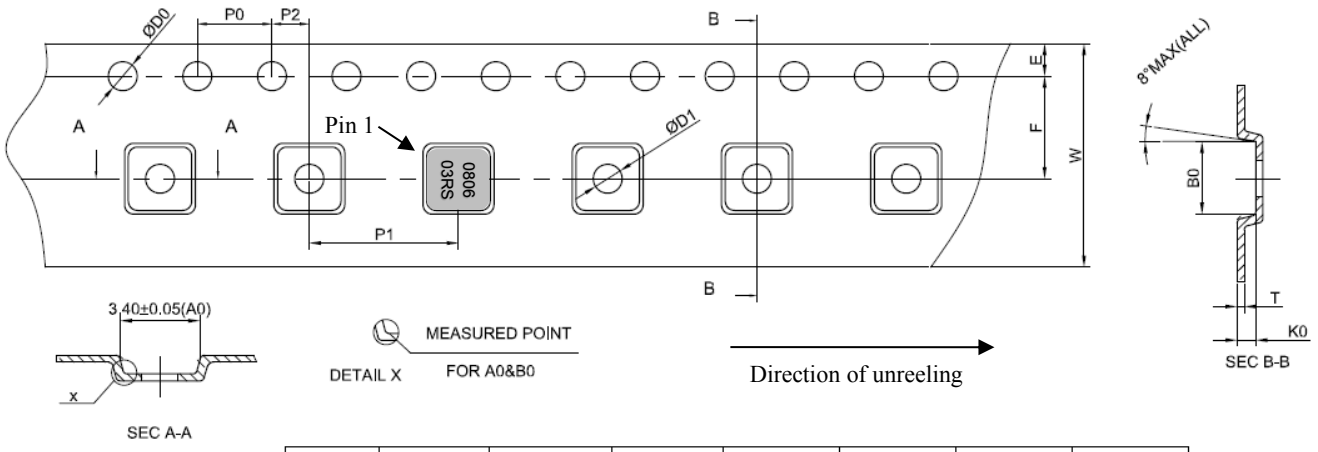
Reel Dimension



TAPE SIZE	A	B	C	D	W1	W2	W3
12mm	330±2.0	2.9±0.5	13.0+0.5/-0	23±1.0	12.4 +2/-0	18.4±0.5	12~15

Unit：mm

Carrier Tape Dimension



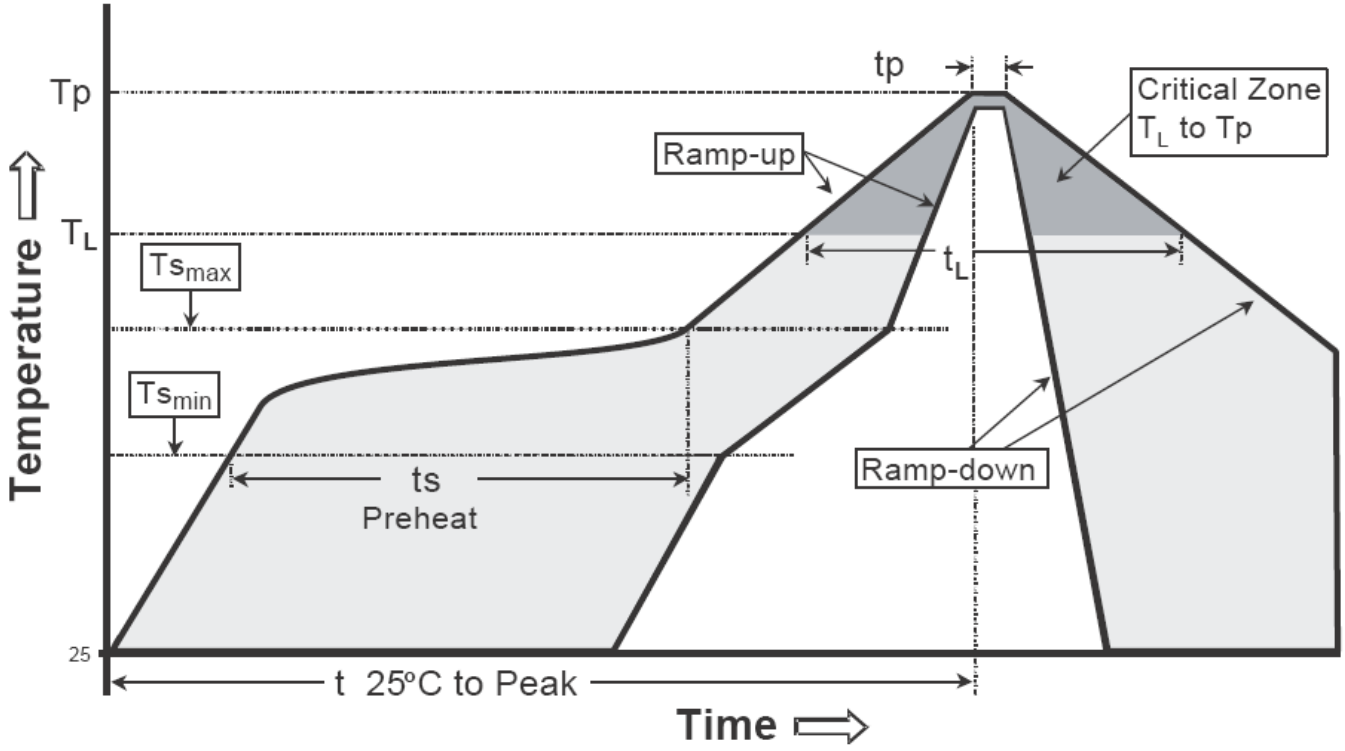
SYMBOL	A0	B0	K0	P0	P1	P2	T
SPEC	3.40±0.05	3.35±0.10	1.10±0.10	4.00±0.10	8.00±0.10	2.00±0.05	0.30±0.05
SYMBOL	E	F	ØD0	ØD1	W	10P0	
SPEC	1.75±0.10	5.50±0.05	1.50 +0.10 -0.00	1.50 +0.10 -0.00	12.00±0.30	40.00±0.20	

Unit：mm

Recommended wave soldering condition

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

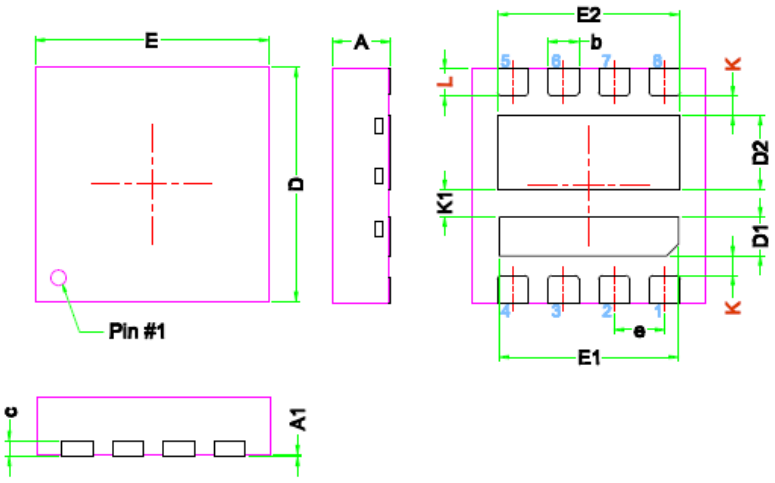
Recommended temperature profile for IR reflow



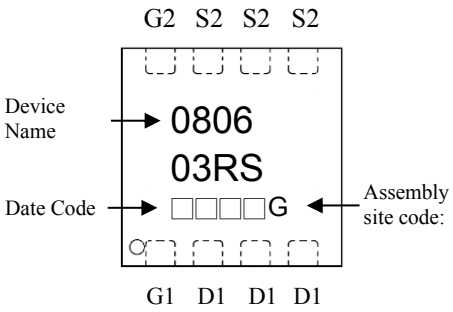
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

DFN3x3A Dimension



Marking:



Note : 1.All dimensions are in mm.
2.Dimensions are not inclusive burrs and mold flash.

8-Lead DFN3x3 Plastic Package
CYStek Package Code: V8

Date Code(counting from left to right) :
1st code: year code, the last digit of Christian year
2nd code : month code, Jan→A, Feb→B, Mar→C,
Apr→D, May→E, Jun→F, Jul→G, Aug→H,
Sep→J, Oct→K, Nov→L, Dec→M
3rd and 4th codes : production serial number, 01~99

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.70	0.80	0.028	0.032	E	2.90	3.10	0.114	0.122
A1	0.00	0.05	0.000	0.002	E1	2.20	2.40	0.087	0.094
b	0.35	0.45	0.014	0.018	E2	2.20	2.45	0.087	0.096
c	0.20	REF	0.008	REF	e	0.55	0.75	0.008	0.030
D	2.90	3.10	0.114	0.122	K	0.15	0.35	0.006	0.014
D1	0.40	0.60	0.016	0.024	K1	0.25	0.45	0.010	0.018
D2	0.85	1.05	0.033	0.041	L	0.27	0.40	0.011	0.016

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.

Important Notice:

- All rights are reserved. Reproduction in whole or in part is prohibited without the prior written approval of CYStek.
- CYStek reserves the right to make changes to its products without notice.
- CYStek ***semiconductor products are not warranted to be suitable for use in Life-Support Applications, or systems.***
- CYStek assumes no liability for any consequence of customer product design, infringement of patents, or application assistance.