Asymmetric Dual N- Channel Enhancement Mode MOSFET

MTNN582803ARSH8

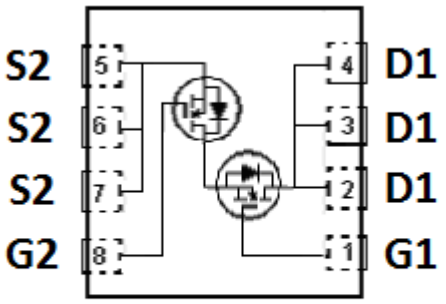
	Tr 1	Tr 2
BV_{DSS}	30V	30V
I_D@V_{GS}=10V, T_A=25°C	13.2A	15.3A
I_D@V_{GS}=10V, T_C=25°C	46A	63.8A
$R_{DSON(typ)}$@V_{GS}=10V	5mΩ	2.7mΩ
$R_{DSON(typ)}$@V_{GS}=4.5V	8mΩ	4.5mΩ

Features

- Simple drive requirement
- Low on-resistance
- Fast switching speed
- Pb-free lead plating and halogen-free package

Equivalent Circuit

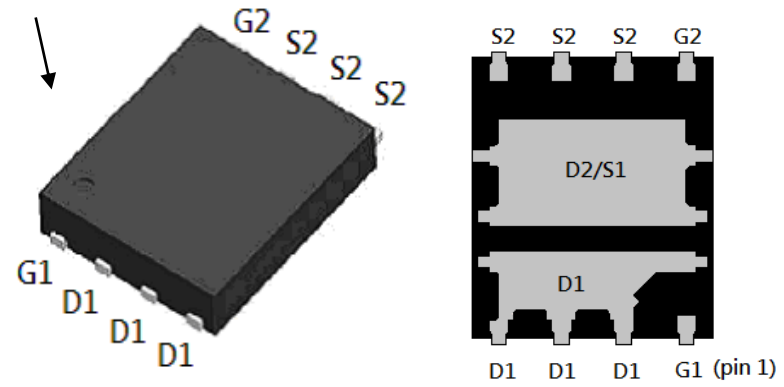
MTNN582803ARSH8



S1 and D2 are connected to the bottom side.

Outline

DFN5x6



Top View

Bottom View

Ordering Information

Device	Package	Shipping
MTNN582803ARSH8-0-T6-G	DFN 5 x6 (Pb-free lead plating & 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
			Tr 1	Tr 2	
Drain-Source Breakdown Voltage		BV_{DSS}	30	30	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current	T_A=25 °C, V_{GS}=10V	I_D	13.2	15.3	A
	T_A=100 °C, V_{GS}=10V		8.3	9.7	
	T_C=25 °C, V_{GS}=10V		46	63.8	
	T_C=100 °C, V_{GS}=10V		29	40.4	
Pulsed Drain Current (Note 1 & 2)		I_{DM}	184	225.2	
Single Pulse Avalanche Current @ L=0.1mH		I_{AS}	12.9	21.8	
Single Pulse Avalanche Energy @ L=0.5mH (Note 4)		E_{AS}	23	105	mJ
Power Dissipation	T_A=25 °C (Note 3)	P_{DSM}	2	2	W
	T_A=70 °C (Note 3)		1.3	1.3	
	T_C=25 °C	P_D	34	34	
	T_C=100 °C		9.6	13.6	
Operating Junction and Storage Temperature Range		Tj; Tstg	-55~+150		°C

Thermal Data

Parameter	Symbol	Value		Unit
Thermal Resistance, Junction-to-case, max	$R_{\theta JC}$	5.1	3.6	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{\theta JA}$	62.5	62.5	

Note : 1. Pulse width limited by maximum junction temperature
2. Duty cycle≤1%
3. Surface mounted on 1 in² copper pad of FR-4 board, t≤10s; 125°C/W when mounted on minimum copper pad.
4. For Tr 1, 100% tested by conditions of L=0.1mH, V_{DD}=15V, V_{GS}=10V, I_{AS}=5A; for Tr 2, 100% tested by conditions of L=0.5mH, V_{DD}=15V, V_{GS}=10V, I_{AS}=6A

Tr 1, Electrical Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.04	-	mV/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	1.0	-	2.5	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
	-	-	25		V_{DS}=24V, V_{GS}=0V, Tj=125°C
*$R_{DS(ON)}$	-	5	6.5	mΩ	V_{GS}=10V, I_D=20A
	-	8	11.5		V_{GS}=4.5V, I_D=20A
*G_{FS}	-	16.1	-	S	V_{DS}=5V, I_D=20A
Dynamic					
Ciss	-	764	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Coss	-	526	-		
Crss	-	67	-		
*$td_{(ON)}$	-	8.4	-	ns	V_{DS}=15V, I_D=20A, V_{GS}=10V, R_G=1Ω
*tr	-	12.4	-		
*$td_{(OFF)}$	-	24.2	-		
*tf	-	5.8	-		
*Qg(V_{GS}=10V)	-	14.4	-	nC	V_{DS}=15V, I_D=20A, V_{GS}=10V
*Qg(V_{GS}=4.5V)	-	7.2			
*Qgs	-	2.7	-		
*Qgd	-	2.9	-		
Rg	-	0.72	-	Ω	f=1MHz
Body Diode					
*I_S	-	-	20	A	
*I_{SM}	-	-	80		
*V_{SD}	-	0.83	1.2	V	V_{GS}=0V, I_S=10A
*trr	-	17.1	-	ns	I_F=20A, dI_F/dt=100A/μs
*Qrr	-	5.8	-	nC	

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

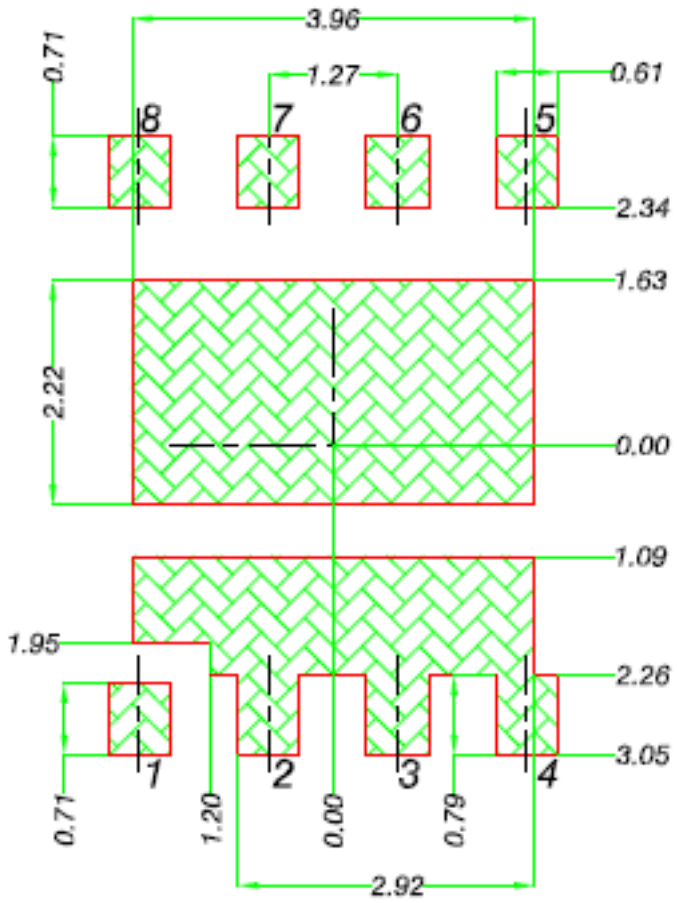
Tr 2, Electrical Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	30	-	-	V	V_{GS}=0V, I_D=-250μA
$\Delta BV_{DSS}/\Delta Tj$	-	0.04	-	mV/°C	Reference to 25°C, I_D=250μA
$V_{GS(th)}$	1.0	-	2.5		V_{DS}=VGS, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
	-	-	25		V_{DS}=24V, V_{GS}=0V, Tj=125°C
*$R_{DS(ON)}$	-	2.7	3.5	mΩ	V_{GS}=10V, I_D=20A
	-	4.5	6.3		V_{GS}=4.5V, I_D=20A
*G_{FS}	-	25.6	-	S	V_{DS}=5V, I_D=20A

Dynamic					
Ciss	-	1603	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
Coss	-	1087	-		
Crss	-	119	-		
*$td_{(ON)}$	-	14.2	-	ns	V_{DS}=15V, I_D=20A, V_{GS}=10V, R_G=1Ω
*tr	-	14.2	-		
*$td_{(OFF)}$	-	38.5	-		
*tf	-	8.2	-		
*Qg(V_{GS}=10V)	-	28.3	-	nC	V_{DS}=15V, I_D=20A, V_{GS}=10V
*Qg(V_{GS}=4.5V)	-	14.3	-		
*Qgs	-	5.4	-		
*Qgd	-	5.7	-		
Rg	-	0.96	-	Ω	f=1MHz
Body Diode					
*I_S	-	-	28	A	
*I_{SM}	-	-	112		
*V_{SD}	-	0.82	1.2	V	V_{GS}=0V, I_S=14A
*trr	-	30	-	ns	I_F=20A, dI_F/dt=100A/μs
*Qrr	-	16	-	nC	

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

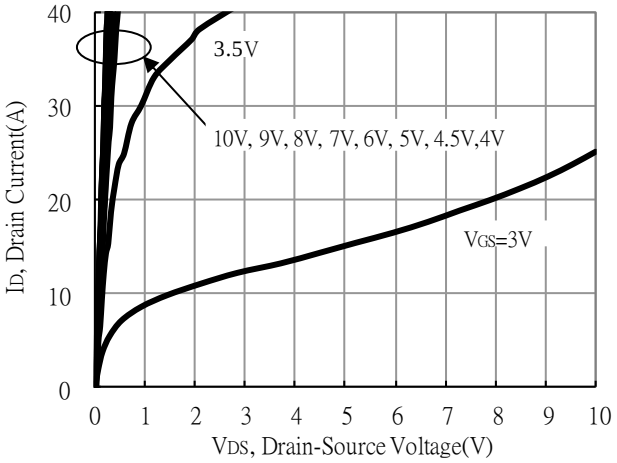
Recommended Soldering Footprint



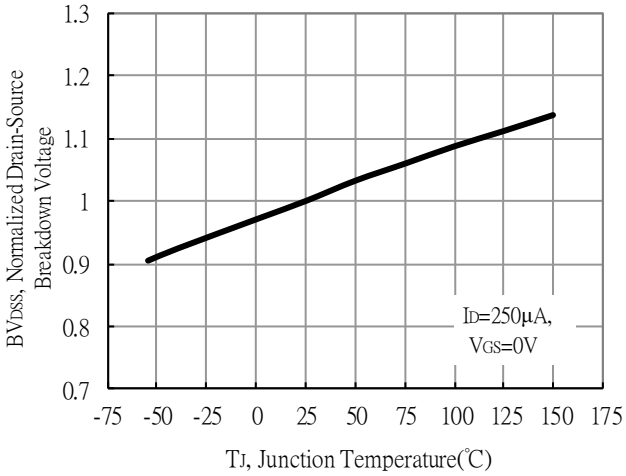
unit : mm

Typical Characteristics : Q1(N-channel)

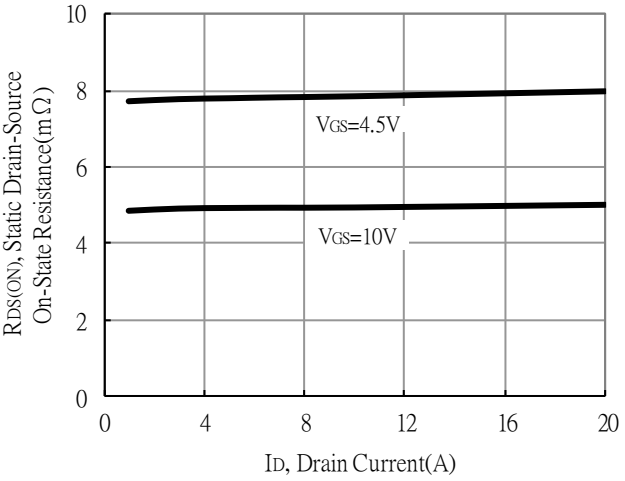
Typical Output Characteristics



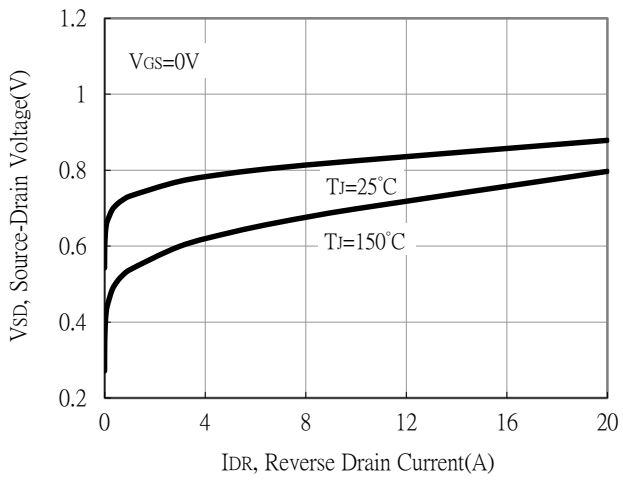
Brekdown Voltage vs Ambient Temperature



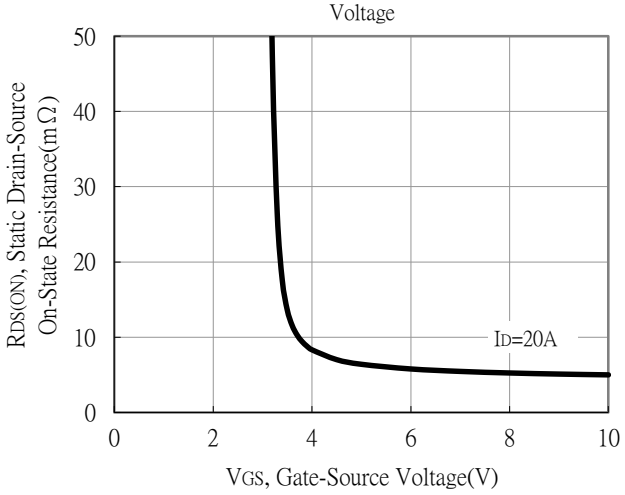
Static Drain-Source On-State resistance vs Drain Current



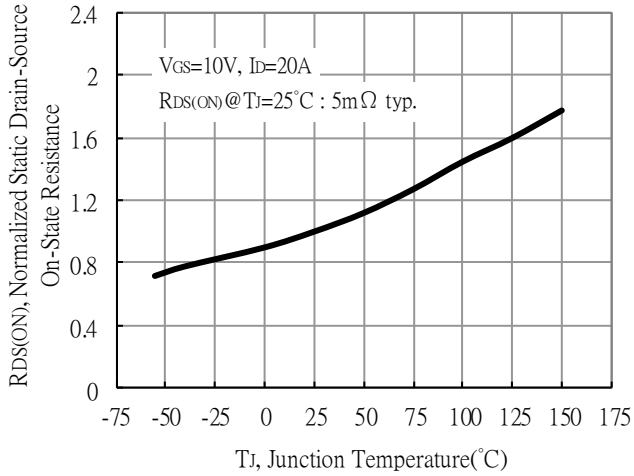
Reverse Drain Current vs Source-Drain Voltage



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

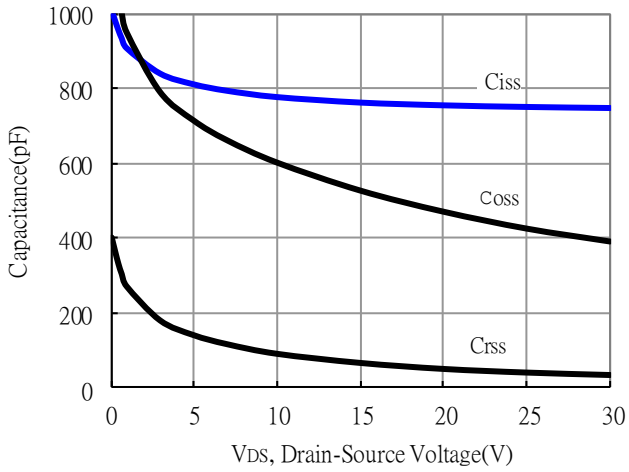


Drain-Source On-State Resistance vs Junction Tempearture

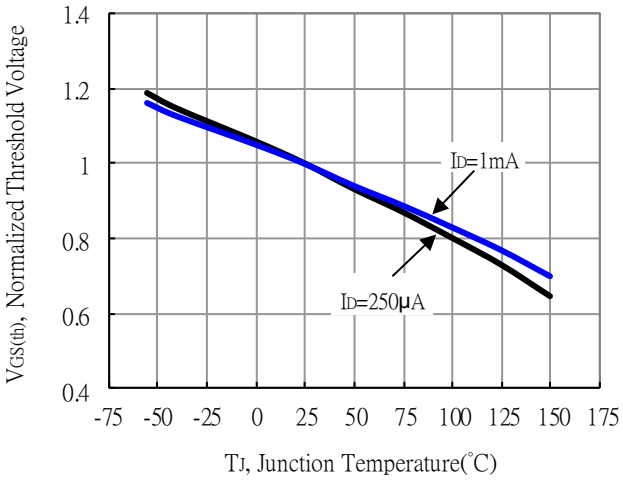


Typical Characteristics(Cont.) : Q1(N-channel)

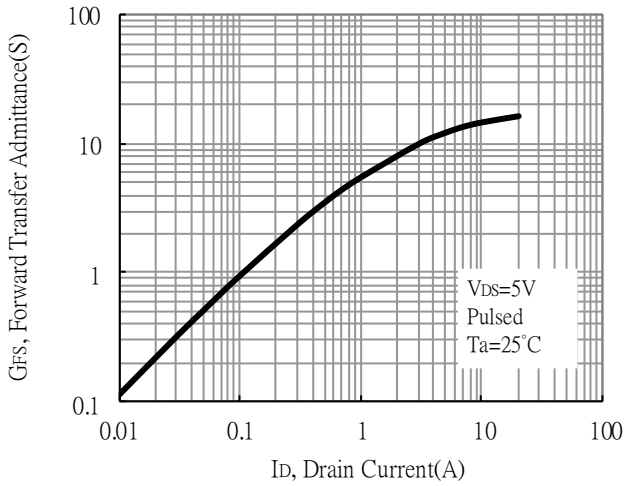
Capacitance vs Drain-to-Source Voltage



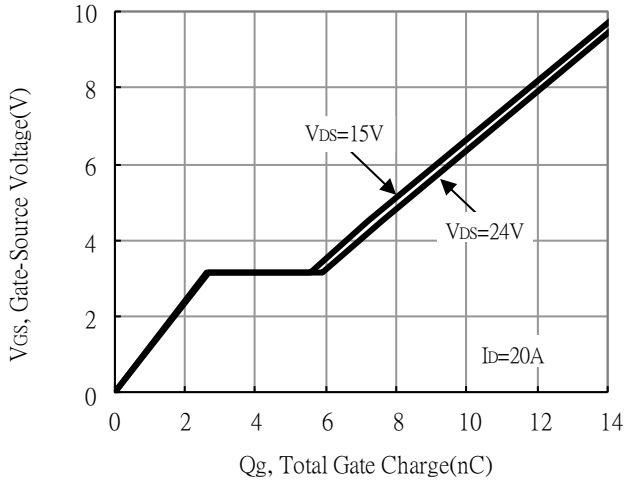
Threshold Voltage vs Junction Tempearture



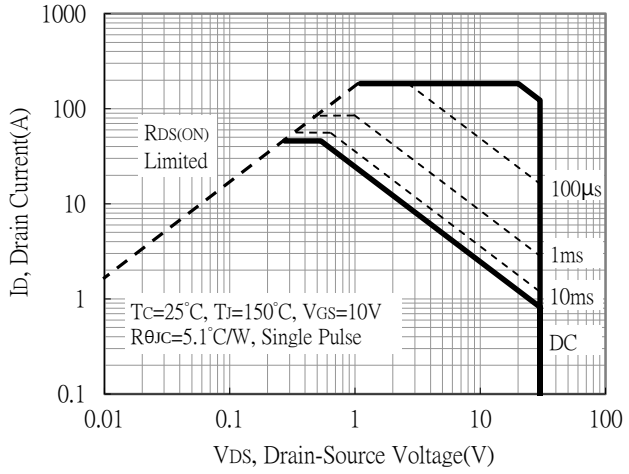
Forward Transfer Admittance vs Drain Current



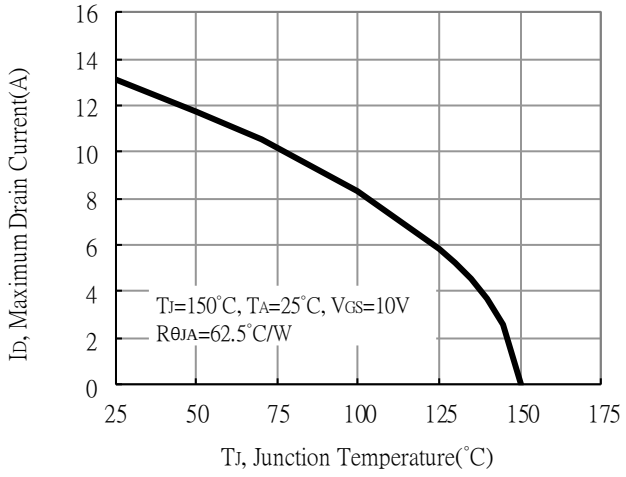
Gate Charge Characteristics



Maximum Safe Operating Area

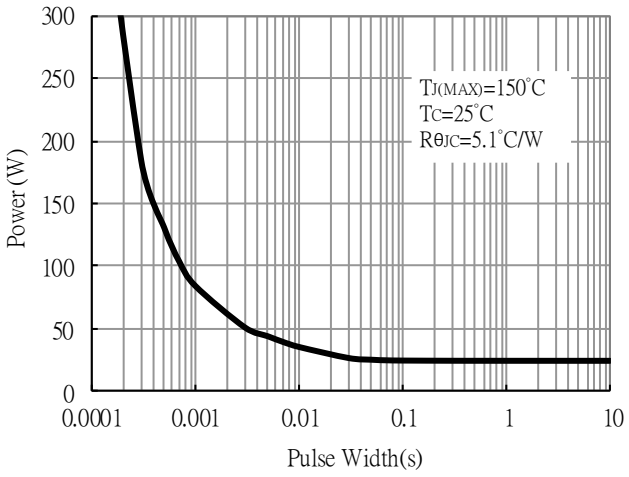


Maximum Drain Current vs JunctionTemperature

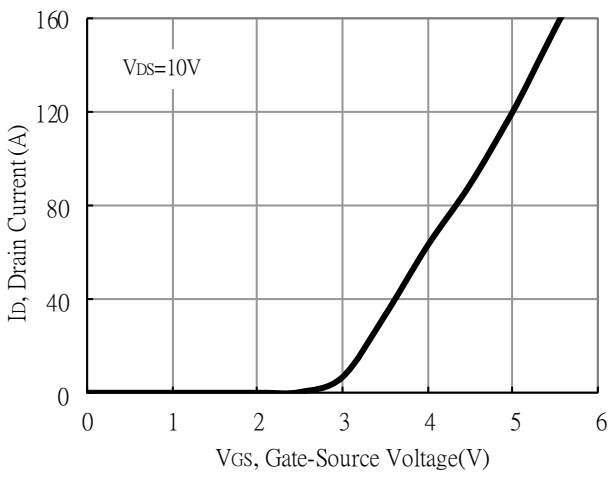


Typical Characteristics(Cont.) : Q1(N-channel)

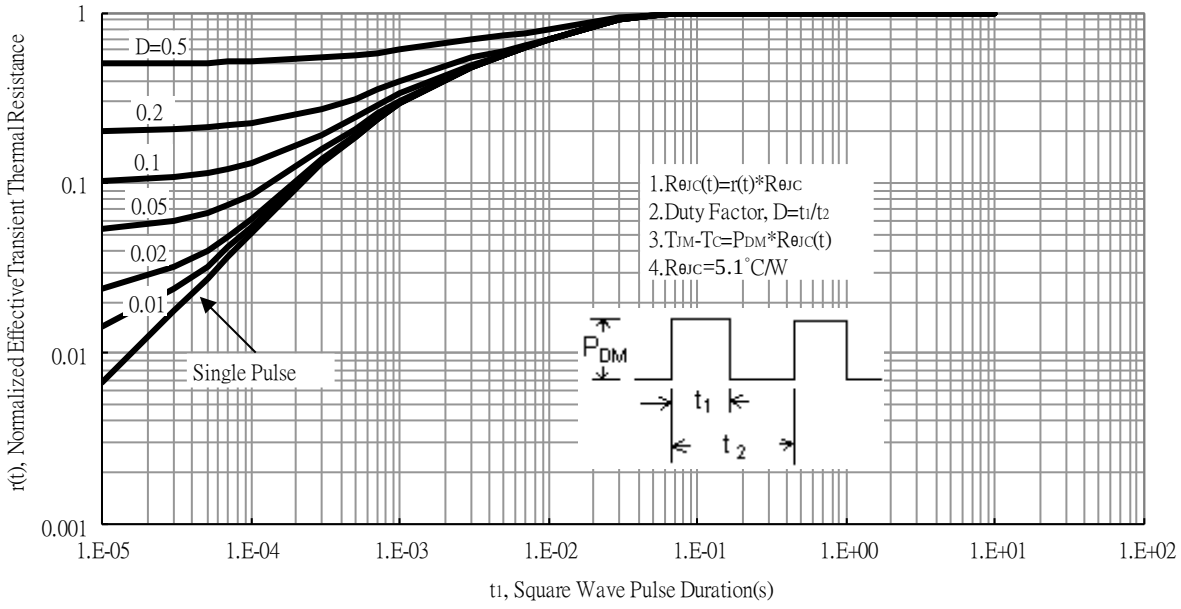
Single Pulse Power Rating, Junction to Case



Typical Transfer Characteristics

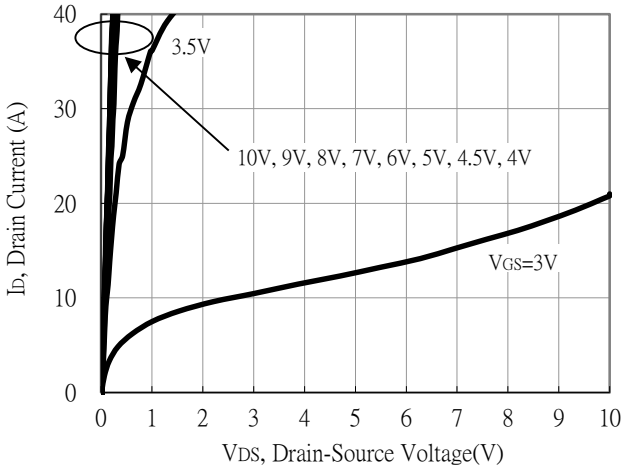


Transient Thermal Response Curves

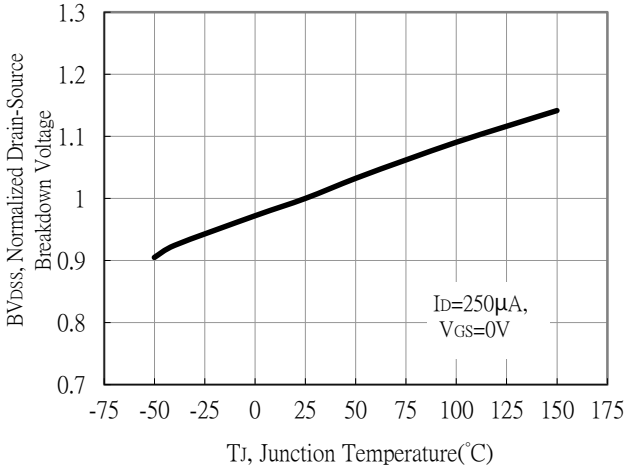


Typical Characteristics : Q2(N-channel)

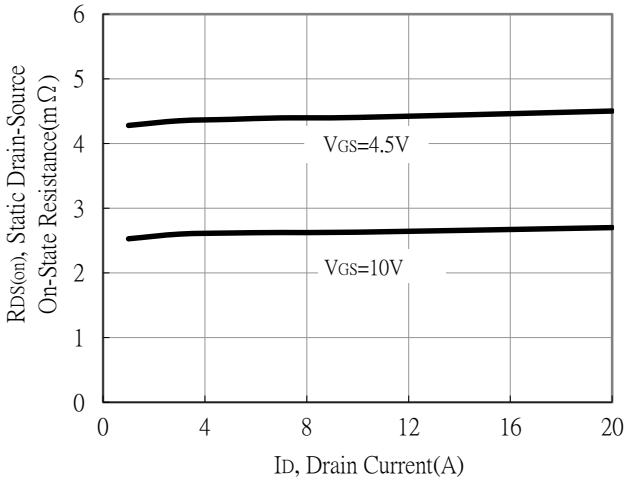
Typical Output Characteristics



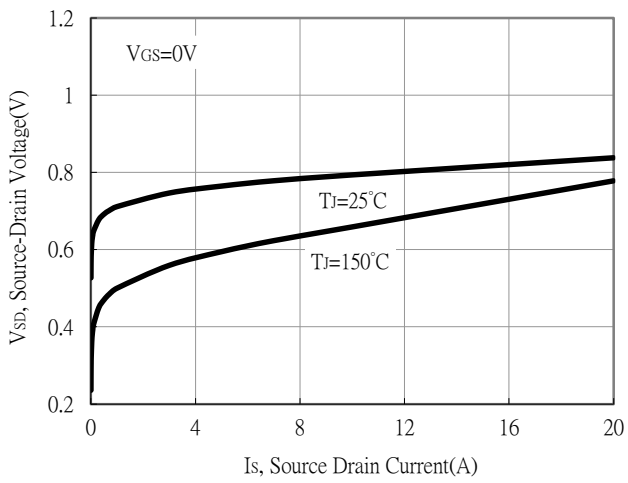
Brekdown Voltage vs Ambient Temperature



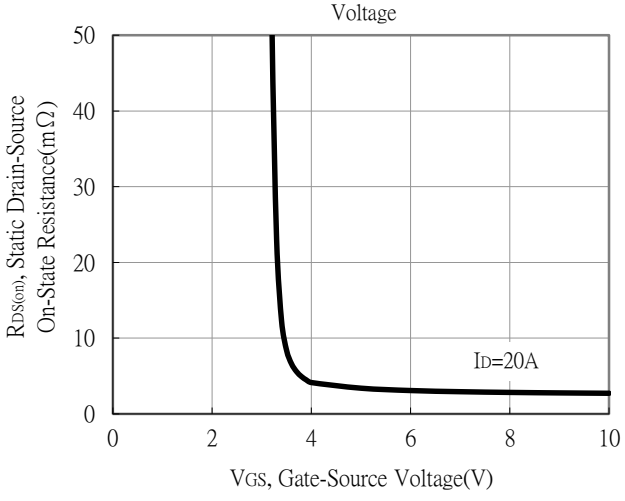
Static Drain-Source On-State resistance vs Drain Current



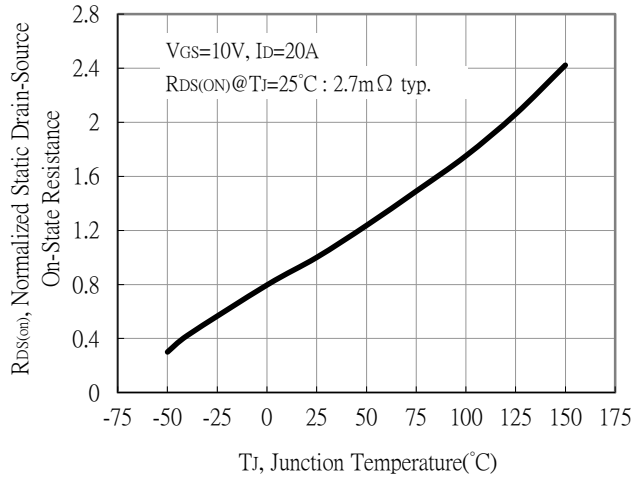
Source Drain Current vs Source-Drain Voltage



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

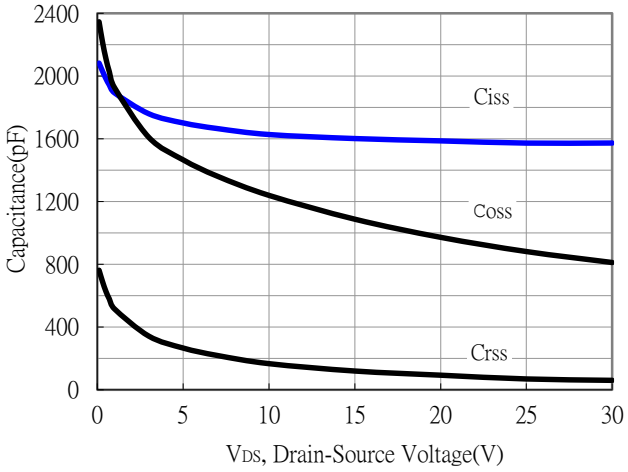


Drain-Source On-State Resistance vs Junction Tempearture

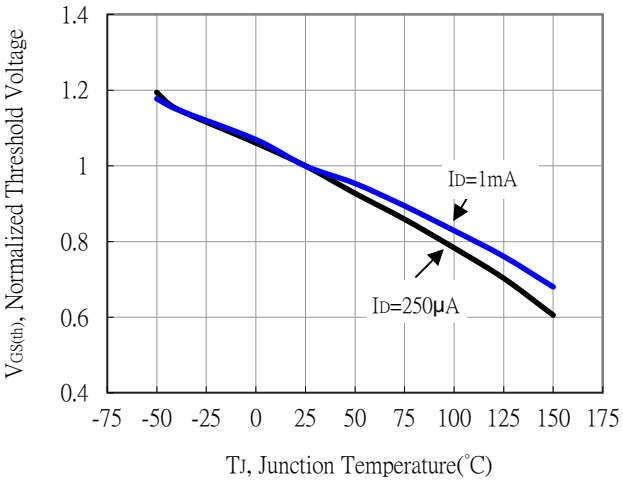


Typical Characteristics(Cont.) : Q2(N-channel)

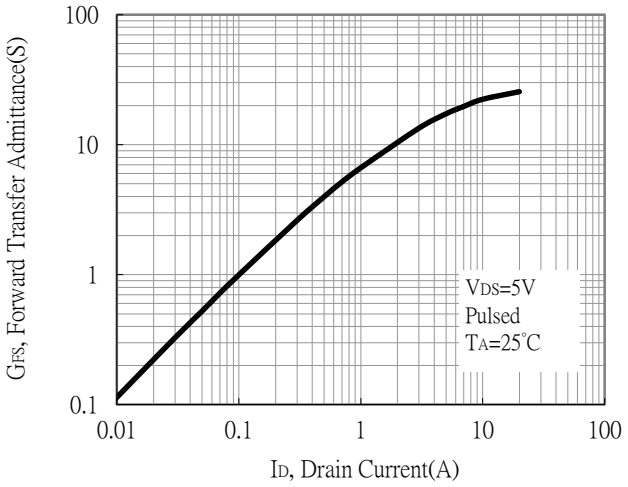
Capacitance vs Drain-to-Source Voltage



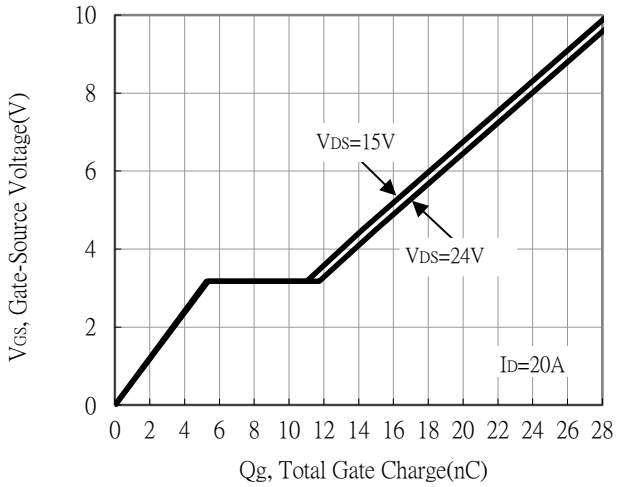
Threshold Voltage vs Junction Tempearture



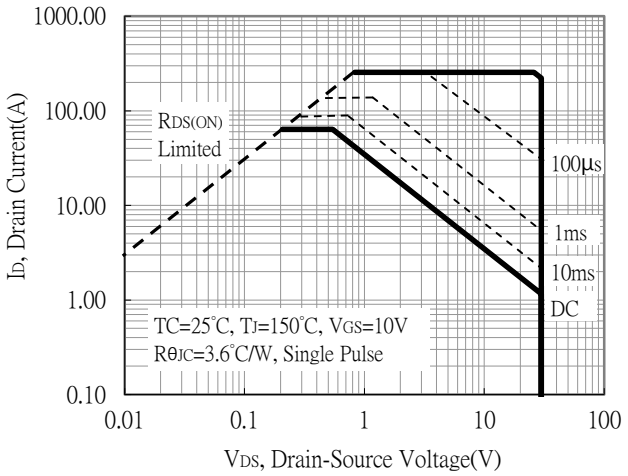
Forward Transfer Admittance vs Drain Current



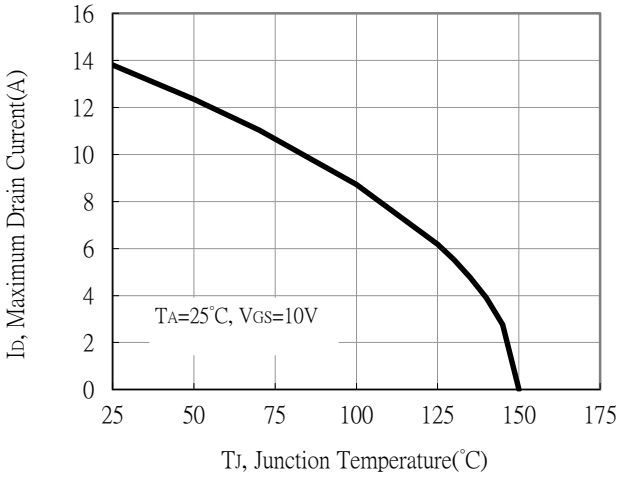
Gate Charge Characteristics



Maximum Safe Operating Area

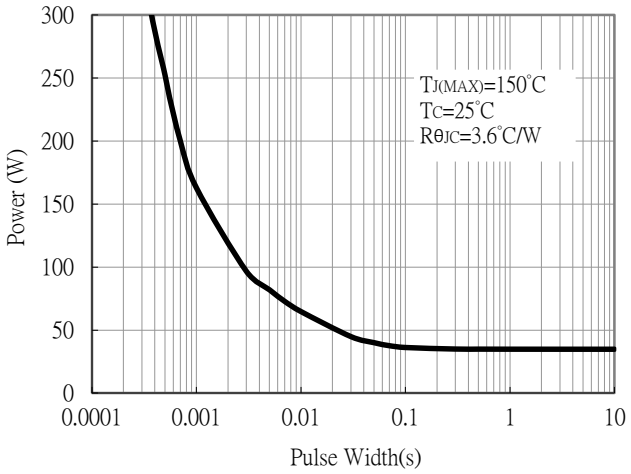


Maximum Drain Current vs Junction Temperature

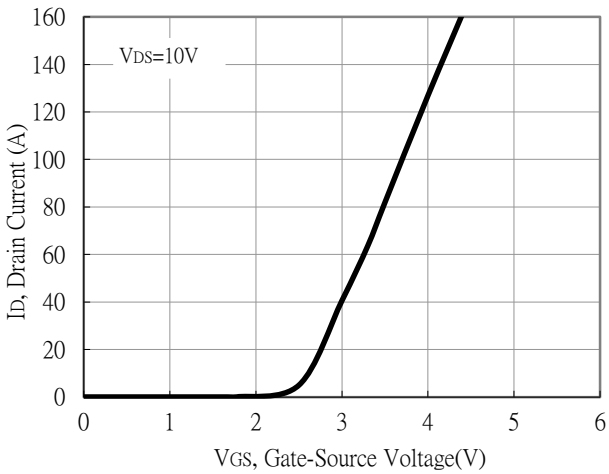


Typical Characteristics(Cont.) : Q2(N-channel)

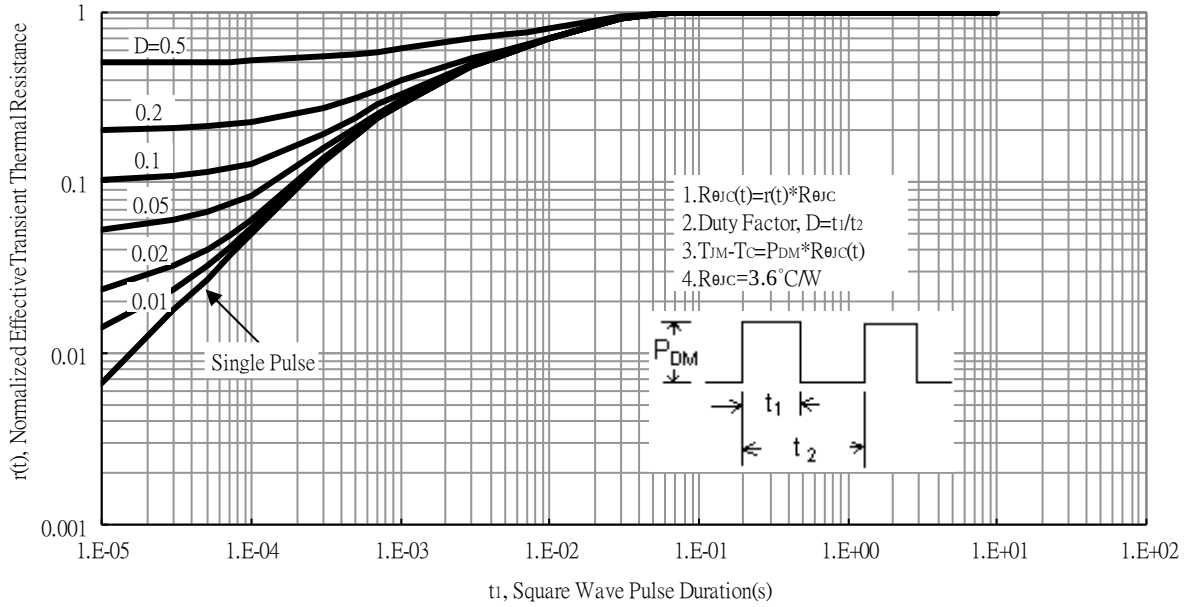
Single Pulse Power Rating, Junction to Case



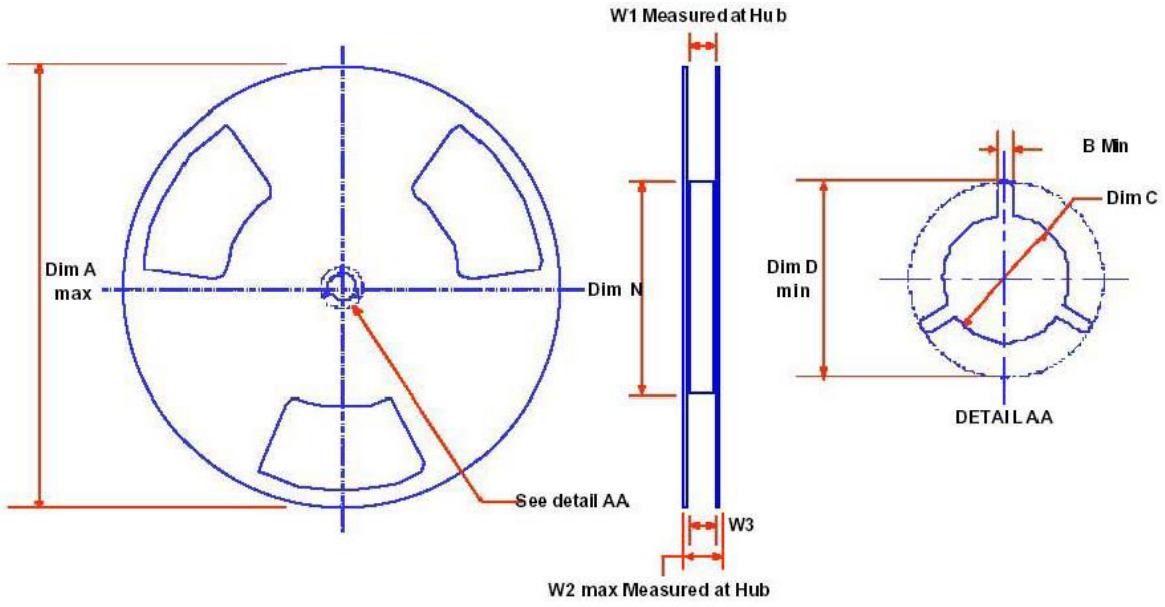
Typical Transfer Characteristics



Transient Thermal Response Curves



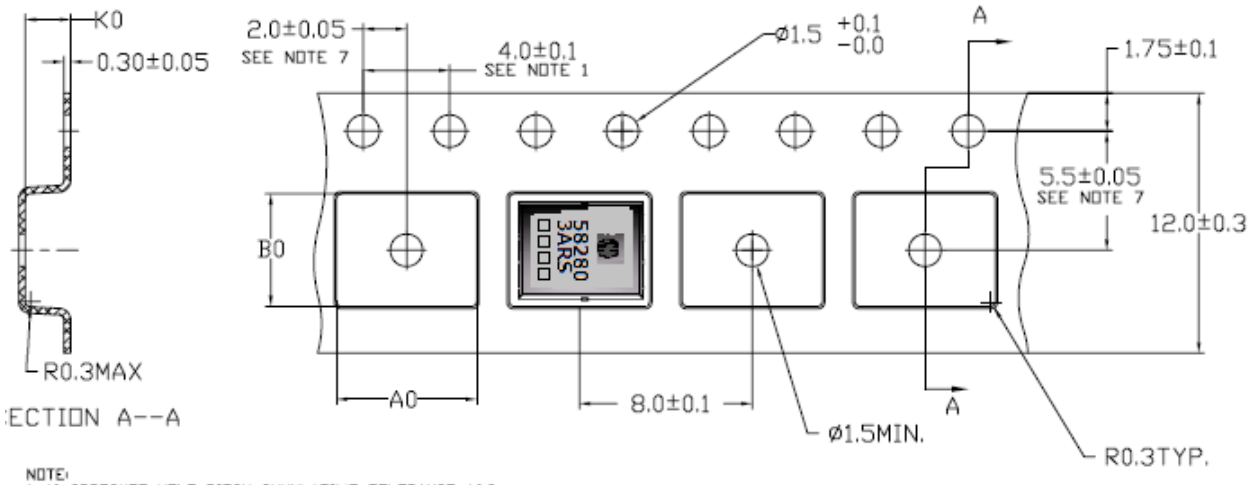
Reel Dimension



Dimensions are in inches and millimeters

Tape Size	Reel Option	Dim A	Dim B	Dim C	Dim D	Dim N	Dim W1	Dim W2	Dim W3 (LSL-USL)
12mm	13" Dia (STD/L99Z)	13.00 330+/-1	0.059 1.5 Min.	0.512 13.0 Min.	0.795 20.2 (ref.)	7.00 178+0/-2	0.488 +0.078/-0.000 12.4 +2/0	0.724 18.4 (ref.)	0.469 – 0.606 11.9 – 15.4

Carrier Tape Dimension



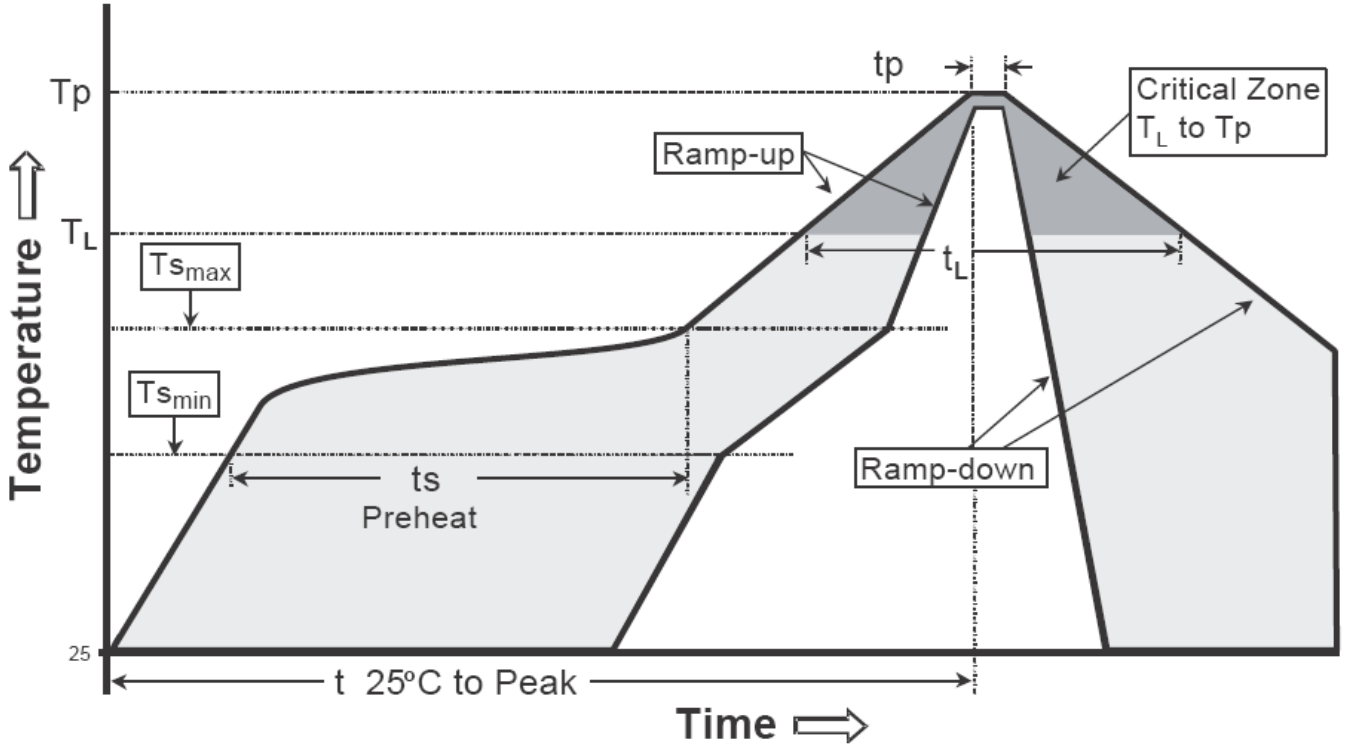
NOTE:
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2. CAMBER NOT TO EXCEED 1mm IN 100mm, NONCUMULATIVE OVER 250mm.
3. MATERIAL: BLACK STATIC DISSIPATIVE PS.(POLYSTYRENE)
4. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED)
5. A0 AND B0 MEASURED ON A PLANE 0.3mm ABOVE THE BOTTOM OF THE POCKET
6. K0 MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
7. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE
8. SURFACE RESISTIVITY
   1X10E4~1X10E11 OHMS/SQ.

A0=6.5±0.1
B0=5.3±0.1
K0=1.4±0.1

Recommended wave soldering condition

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

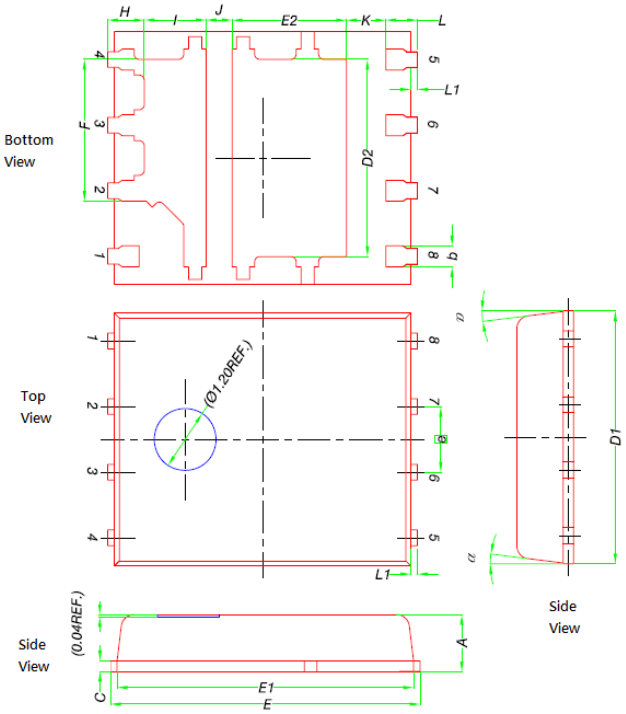
Recommended temperature profile for IR reflow



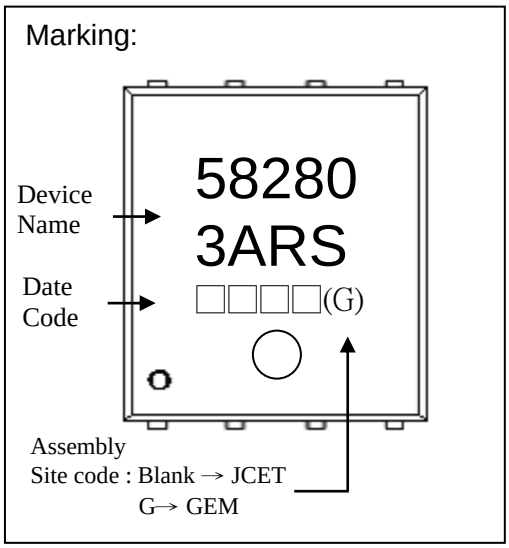
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

DFN5x6 Dimension



Note:
1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Tie Bar , Tie Bar Burrs, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
4. The Package Top May Be Smaller Than The Package Bottom.



8-Lead DFN5x6 Plastic Package
CYS Package Code : H8

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	0.90	1.10	0.035	0.043	F	2.55	2.90	0.100	0.114
b	0.33	0.51	0.013	0.020	H	0.61	0.81	0.024	0.032
C	0.20	0.30	0.008	0.012	I	1.10	1.30	0.043	0.051
D1	4.80	5.00	0.189	0.197	J	0.40	0.60	0.016	0.024
D2	3.61	3.96	0.142	0.156	K	0.50	-	0.020	-
E	5.90	6.10	0.232	0.240	L	0.51	0.71	0.020	0.028
E1	5.70	5.80	0.224	0.228	L1	0.06	0.20	0.002	0.008
E2	2.02	2.42	0.080	0.095	α	0°	12°	0°	12°
e	1.27 BSC		0.050 BSC						

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.