N- AND P-Channel Logic Level Enhancement Mode MOSFET

Description

The MTC6816AQ8 consists of a N-channel and a P-channel enhancement-mode MOSFET in a single SOP-8 package, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.
The SOP-8 package is universally preferred for all commercial-industrial surface mount applications.

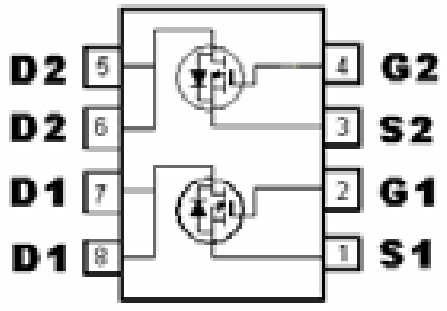
Features

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

	N-CH	P-CH
BV_{DSS}	100V	-100V
I_D	2.4A	-2.2A
$R_{DSON(MAX.)}$	150mΩ	220mΩ

Equivalent Circuit

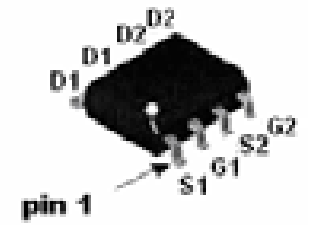
MTC6816AQ8



G：Gate S：Source D：Drain

Outline

SOP-8



Ordering Information

Device	Package	Shipping
MTC6816AQ8-0-T3-G	SOP-8 (Pb-free lead plating & 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 (Tc=25°C, unless otherwise noted)

Parameter		Symbol	Limits		Unit
			N-channel	P-channel	
Drain-Source Breakdown Voltage		BV_{DSS}	100	-100	V
Gate-Source Voltage		V_{GS}	±20	±20	
Continuous Drain Current (Note 2)	T_A=25 °C, V_{GS}=10V (-10V)	I_D	2.4	-2.2	A
	T_A=100 °C, V_{GS}=10V (-10V)		1.5	-1.4	
Pulsed Drain Current (Note 1)		I_{DM}	12	-10	
Power Dissipation for Dual Operation		P_D	2		W
Power Dissipation for Single Operation			1.6 (Note 2)		
			0.9 (Note 3)		
Operating Junction and Storage Temperature Range		Tj; Tstg	-55~+150		°C

Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-case, max	$R_{th,j-c}$	40	°C/W
Thermal Resistance, Junction-to-ambient, max	$R_{th,j-a}$	78 (Note 2)	°C/W
		135 (Note 3)	°C/W

Note : 1.Pulse width limited by maximum junction temperature.
2.Surface mounted on 1 in² copper pad of FR-4 board, pulse width≤10s.
3.Surface mounted on minimum copper pad, pulse width≤10s.

N-Channel Electrical Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	100	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	1.0	1.8	3.0	V	V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	1	μA	V_{DS}=80V, V_{GS}=0
	-	-	25	μA	V_{DS}=70V, V_{GS}=0, Tj=125°C
*$R_{DS(ON)}$	-	121	150	mΩ	I_D=2.4A, V_{GS}=10V
	-	125	160		I_D=2A, V_{GS}=5V
*G_{FS}	-	8	-	S	V_{DS}=5V, I_D=2.4A
Dynamic					
Ciss	-	1237	-	pF	V_{DS}=20V, V_{GS}=0, f=1MHz
Coss	-	38	-		
Crss	-	27	-		
*$td_{(ON)}$	-	13	-	ns	V_{DS}=50V, I_D=1A, V_{GS}=10V, R_G=6Ω
*tr	-	9	-		
*$td_{(OFF)}$	-	36	-		
*tf	-	9	-		
*Qg	-	18	-	nC	V_{DS}=80V, I_D=2.4A, V_{GS}=10V
*Qgs	-	4.2	-		
*Qgd	-	3.6	-		

Body Diode					
*V_{SD}	-	-	1.3	V	V_{GS}=0V, I_S=2.4A
*I_S	-	-	2.4	A	
*I_{SM}	-	-	12		

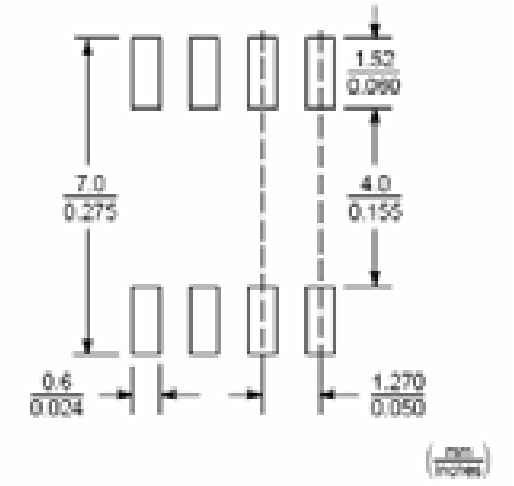
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

P-Channel Electrical Characteristics (Tc=25°C, unless otherwise specified)

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-100	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-1.0	-1.8	-3.0		V_{DS}=VGS, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0
I_{DSS}	-	-	-1	μA	V_{DS}=-80V, V_{GS}=0
	-	-	-25		V_{DS}=-70V, V_{GS}=0, Tj=125°C
*$R_{DS(ON)}$	-	167	220	mΩ	I_D=-1.5A, V_{GS}=-10V
	-	180	230		I_D=-1A, V_{GS}=-5V
*G_{FS}	-	5	-	S	V_{DS}=-5V, I_D=-1.5A
Dynamic					
Ciss	-	1406	-	pF	V_{DS}=-20V, V_{GS}=0, f=1MHz
Coss	-	56	-		
Crss	-	33	-		
*$td_{(ON)}$	-	14	-	ns	V_{DS}=-50V, I_D=-1A, V_{GS}=-10V, R_G=6Ω
*tr	-	10	-		
*$td_{(OFF)}$	-	37	-		
*tf	-	10	-		
*Qg	-	20	-	nC	V_{DS}=-80V, I_D=-2.2A, V_{GS}=-10V
*Qgs	-	4.4	-		
*Qgd	-	4.3	-		
Body Diode					
*V_{SD}	-	-	-1.3	V	V_{GS}=0V, I_S=-2.2A
*I_S	-	-	-2.2	A	
*I_{SM}	-	-	-10		

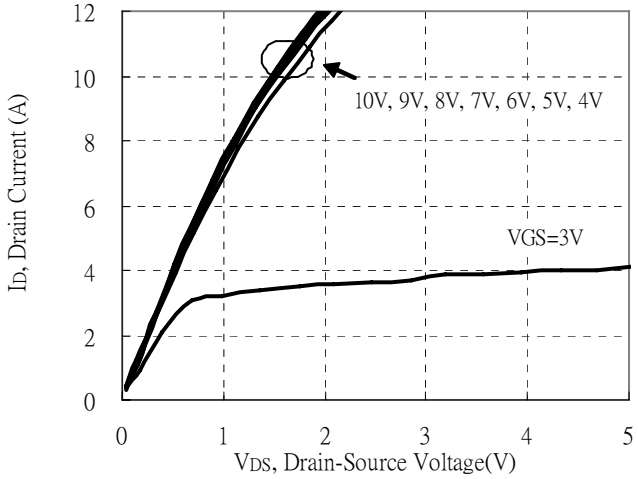
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Recommended Soldering Footprint

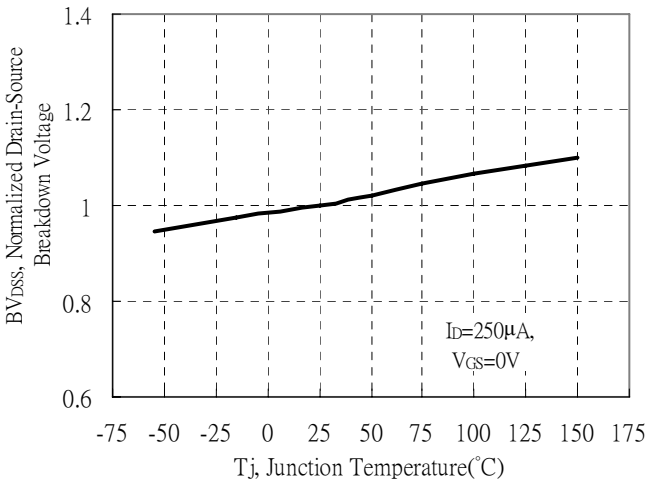


Typical Characteristics : Q1(N-channel)

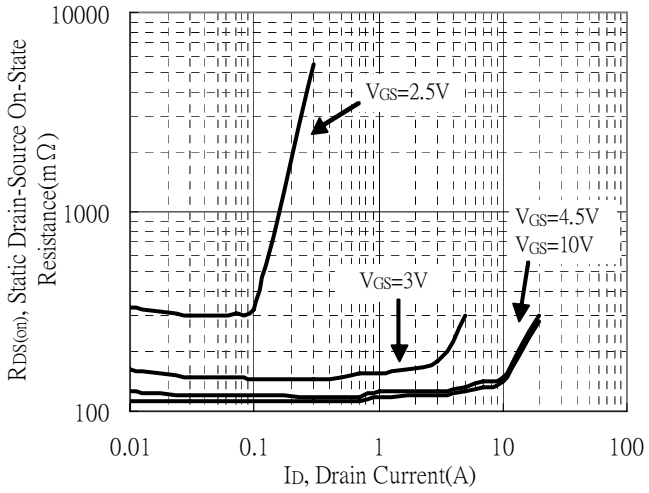
Typical Output Characteristics



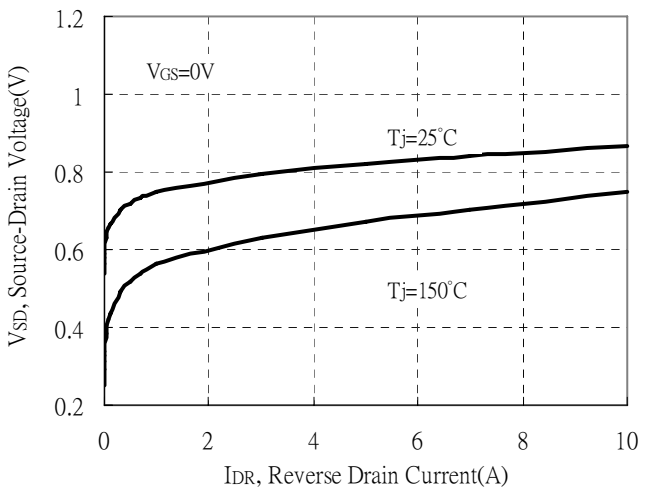
Brekdown Voltage vs Ambient Temperature



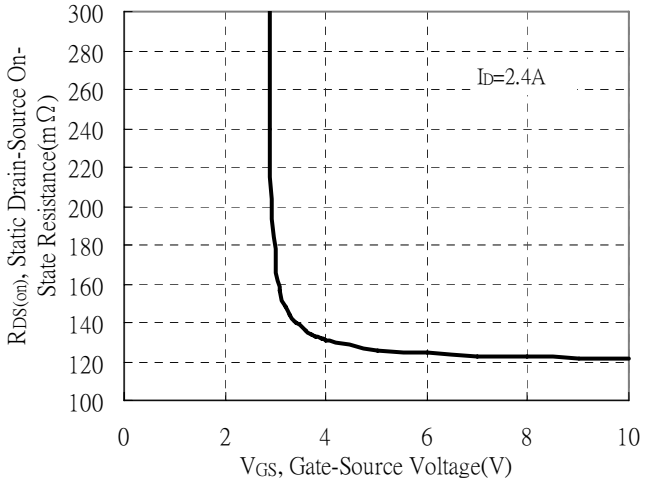
Static Drain-Source On-State resistance vs Drain Current



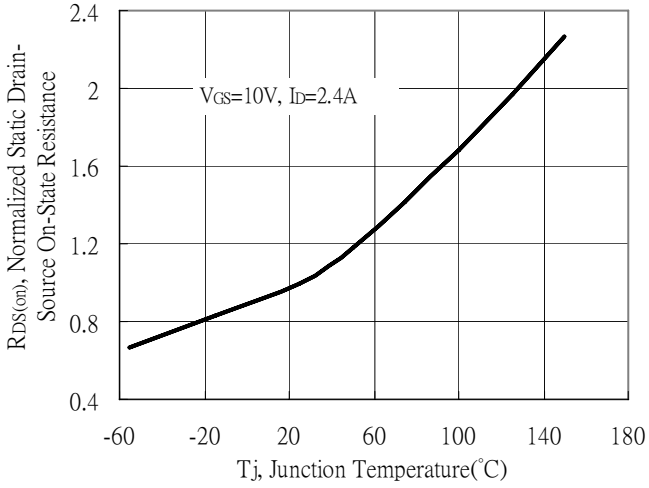
Reverse Drain Current vs Source-Drain Voltage



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

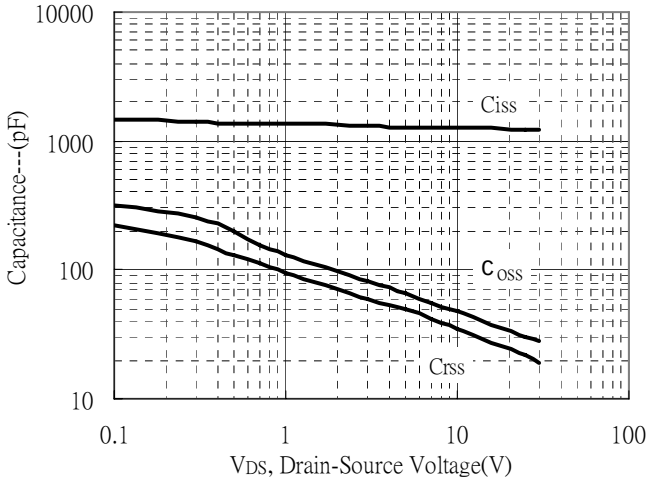


Drain-Source On-State Resistance vs Junction Tempearture

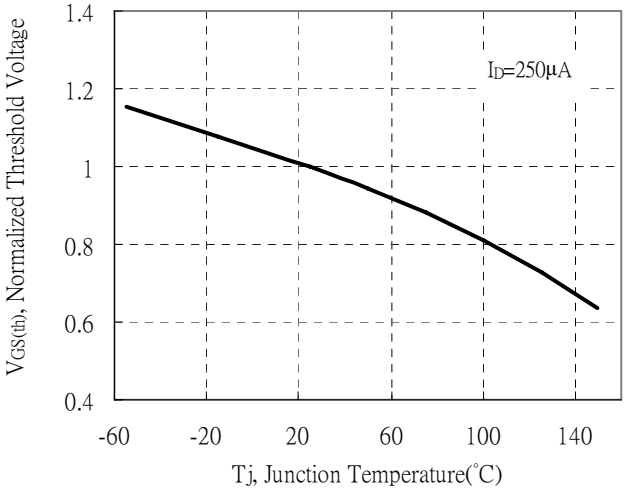


Typical Characteristics(Cont.) : Q1(N-channel)

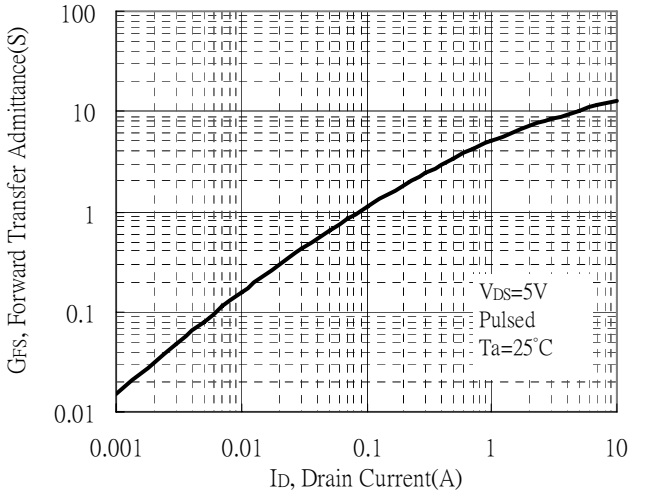
Capacitance vs Drain-to-Source Voltage



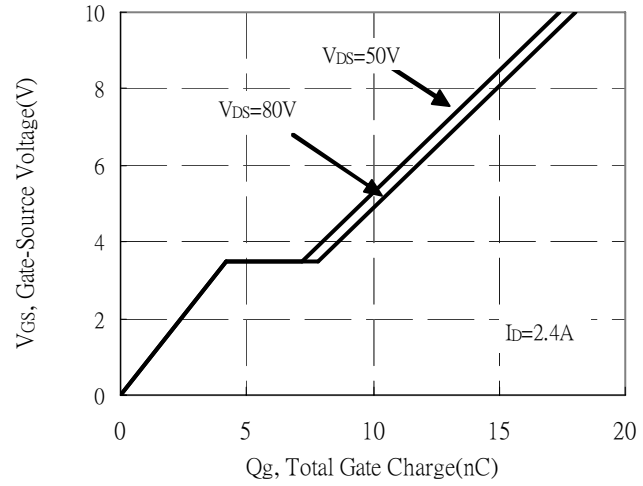
Threshold Voltage vs Junction Tempearture



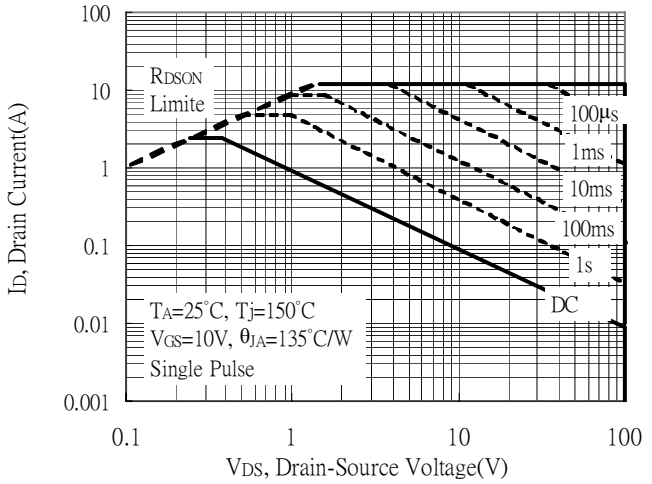
Forward Transfer Admittance vs Drain Current



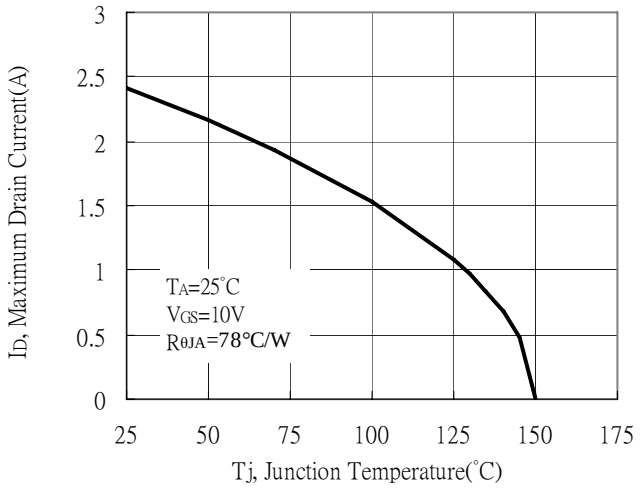
Gate Charge Characteristics



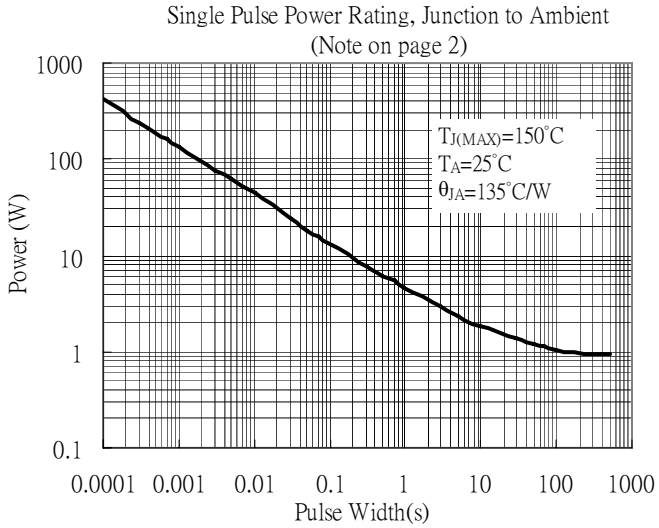
Maximum Safe Operating Area

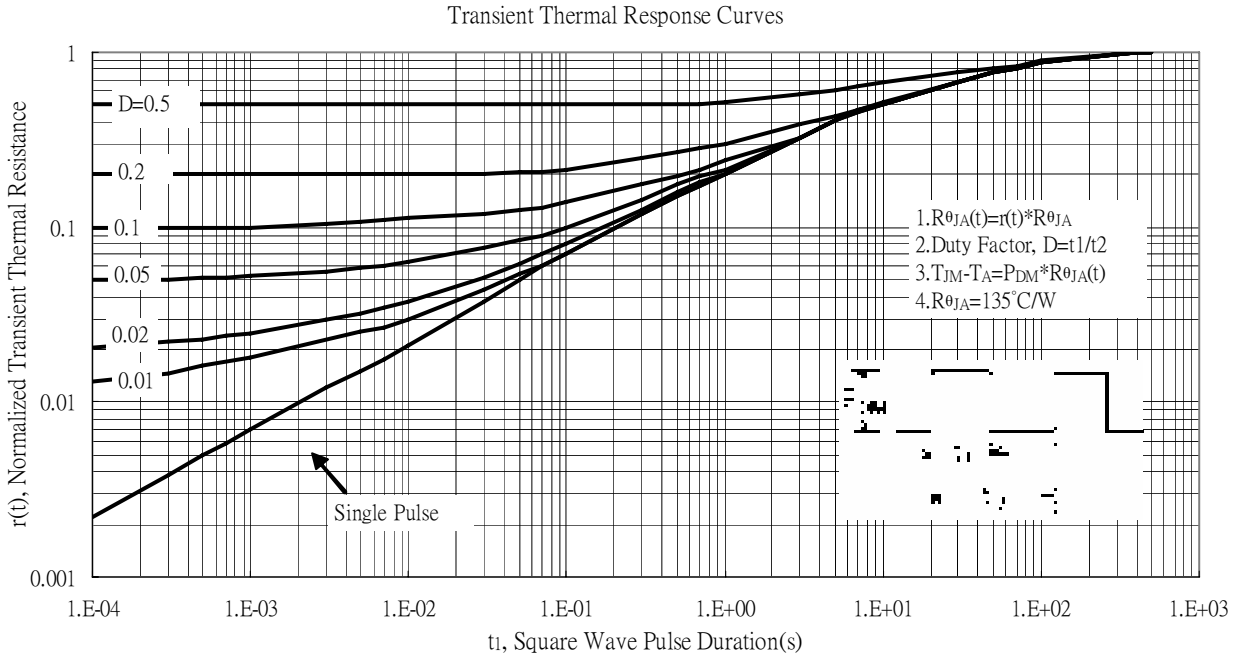


Maximum Drain Current vs Case Temperature



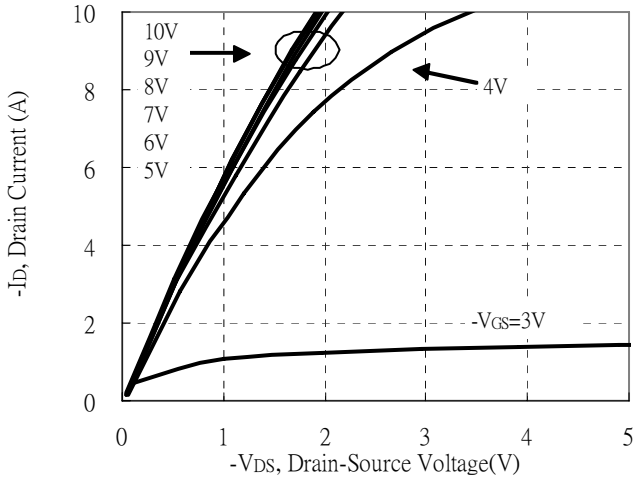
Typical Characteristics(Cont.) : Q1(N-channel)



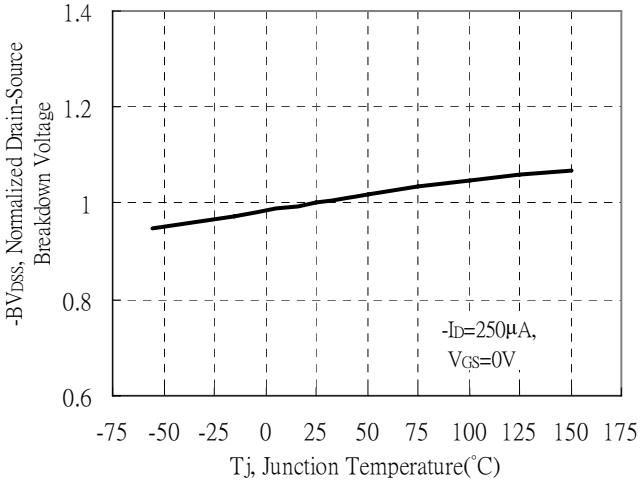


Typical Characteristics : Q2(P-channel)

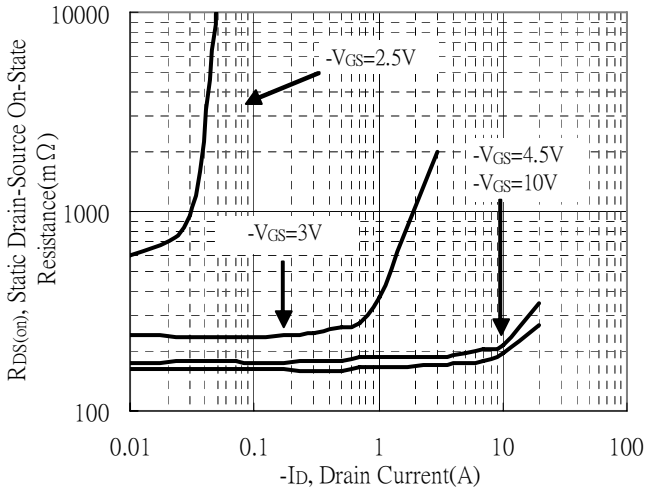
Typical Output Characteristics



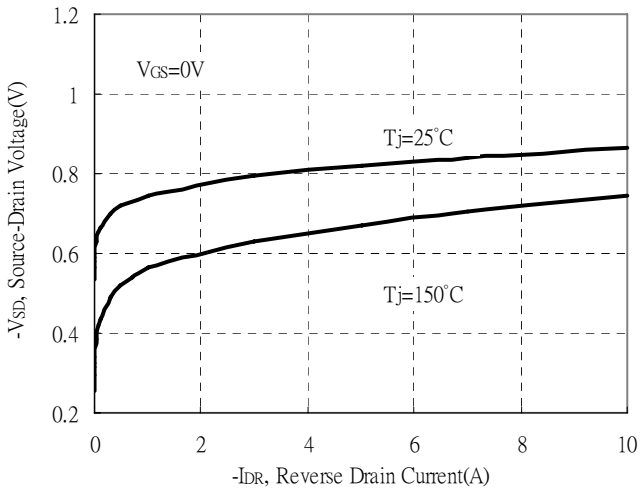
Brekdown Voltage vs Ambient Temperature



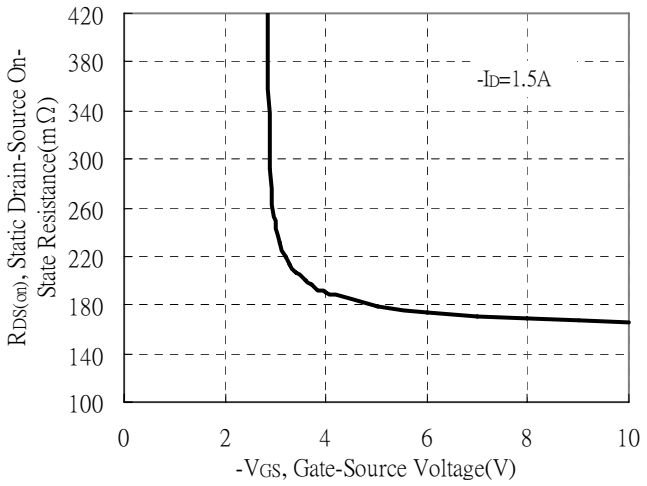
Static Drain-Source On-State resistance vs Drain Current



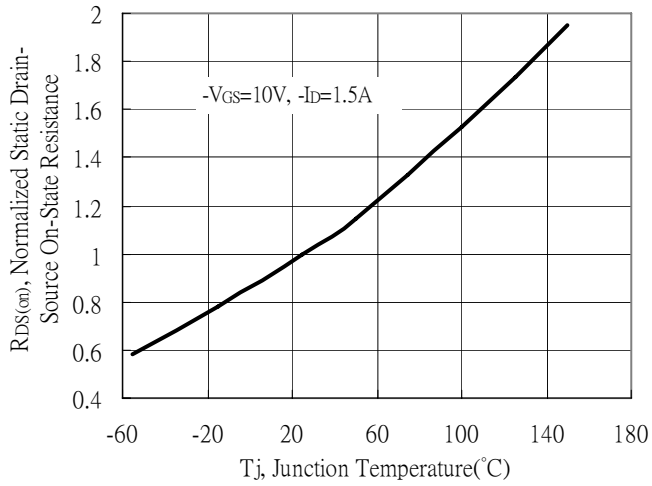
Reverse Drain Current vs Source-Drain Voltage



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

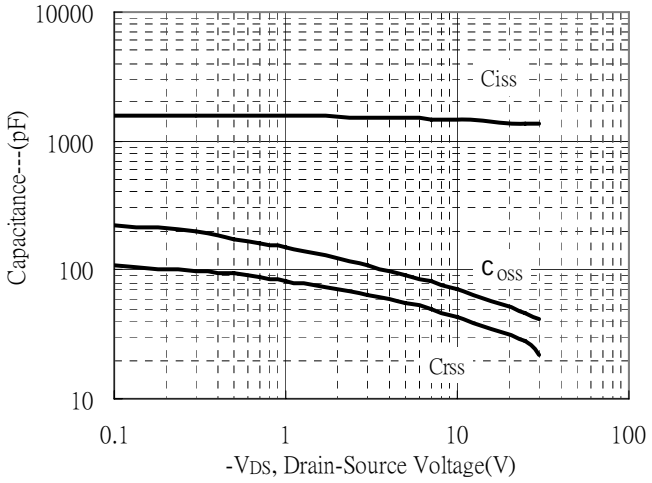


Drain-Source On-State Resistance vs Junction Tempearture

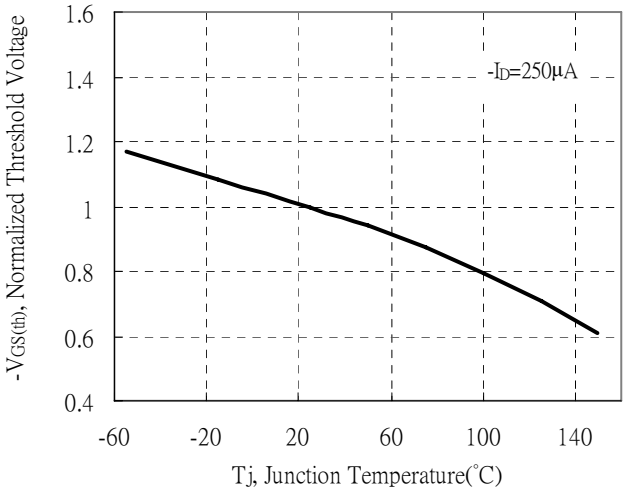


Typical Characteristics(Cont.) : Q2(P-channel)

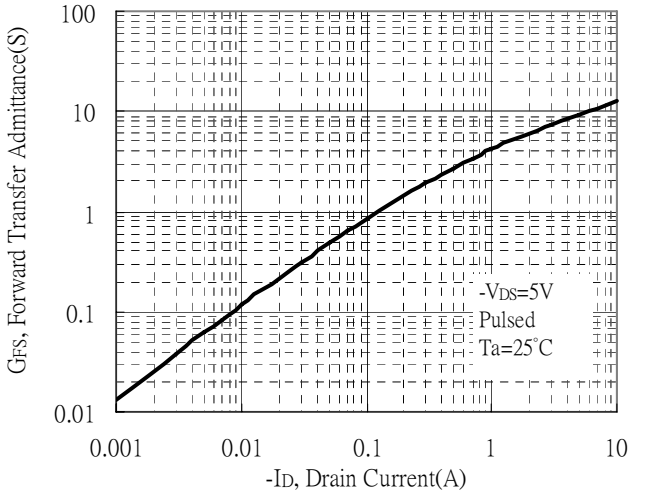
Capacitance vs Drain-to-Source Voltage



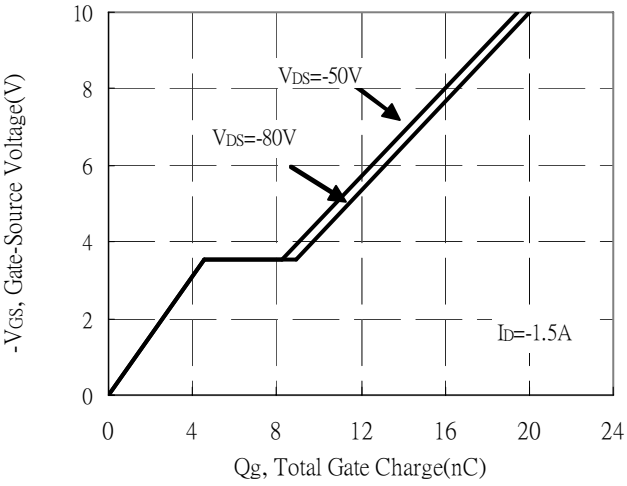
Threshold Voltage vs Junction Tempearture



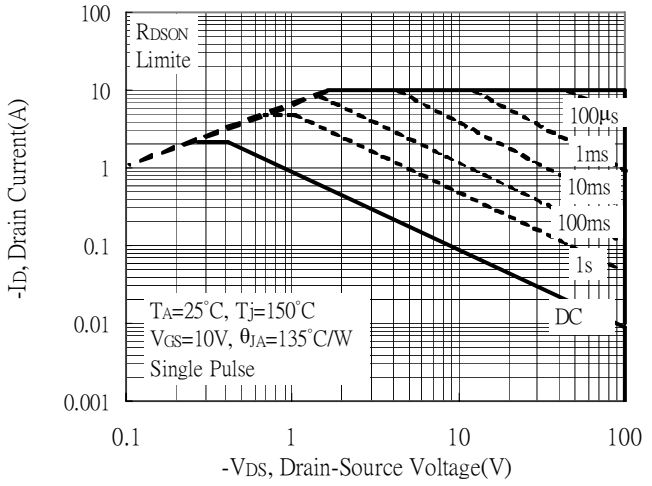
Forward Transfer Admittance vs Drain Current



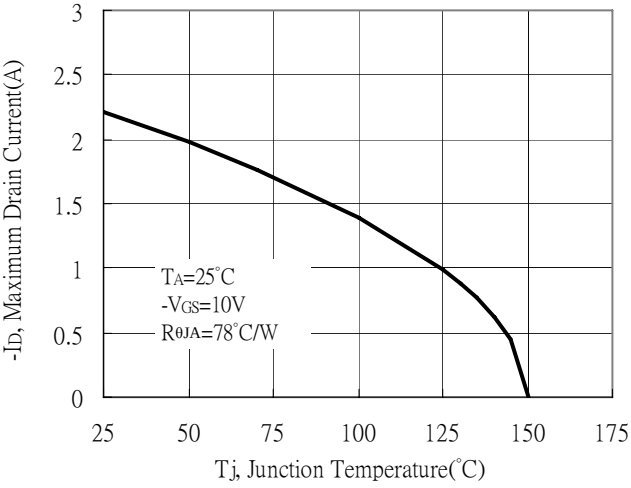
Gate Charge Characteristics



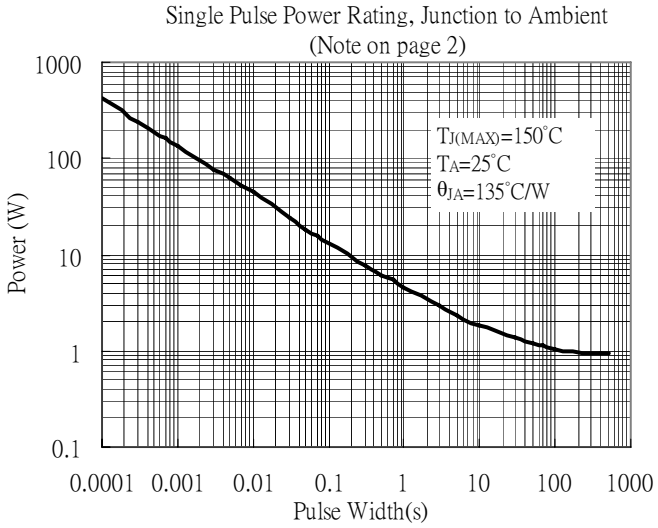
Maximum Safe Operating Area

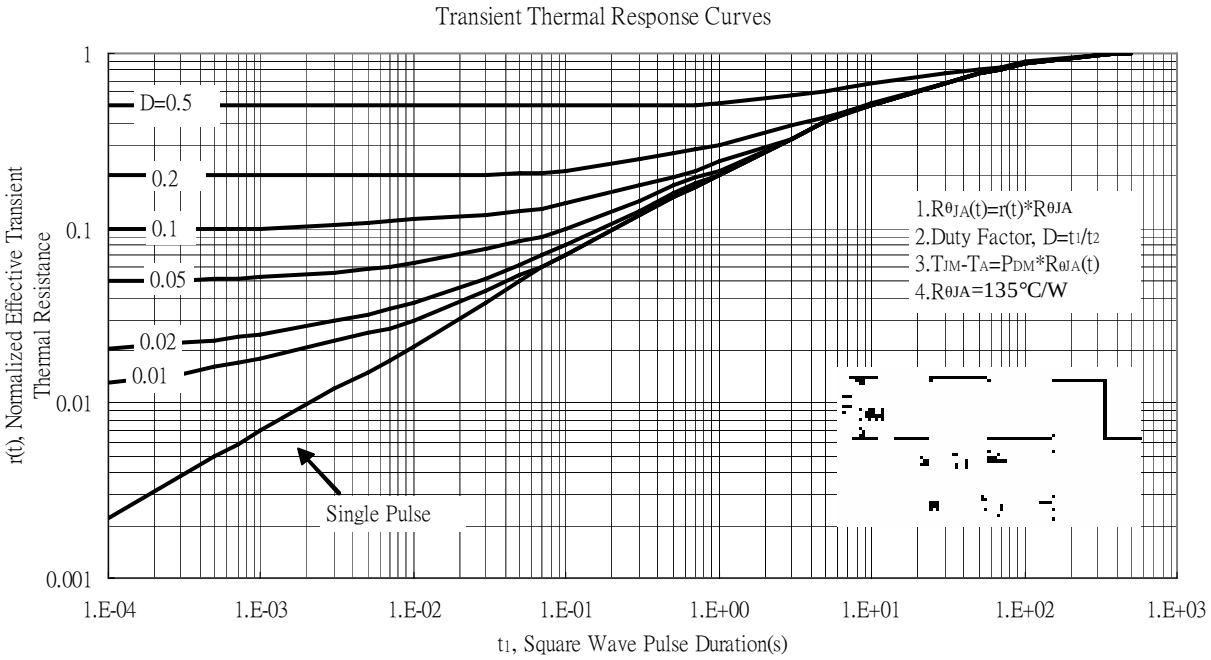


Maximum Drain Current vs Case Temperature

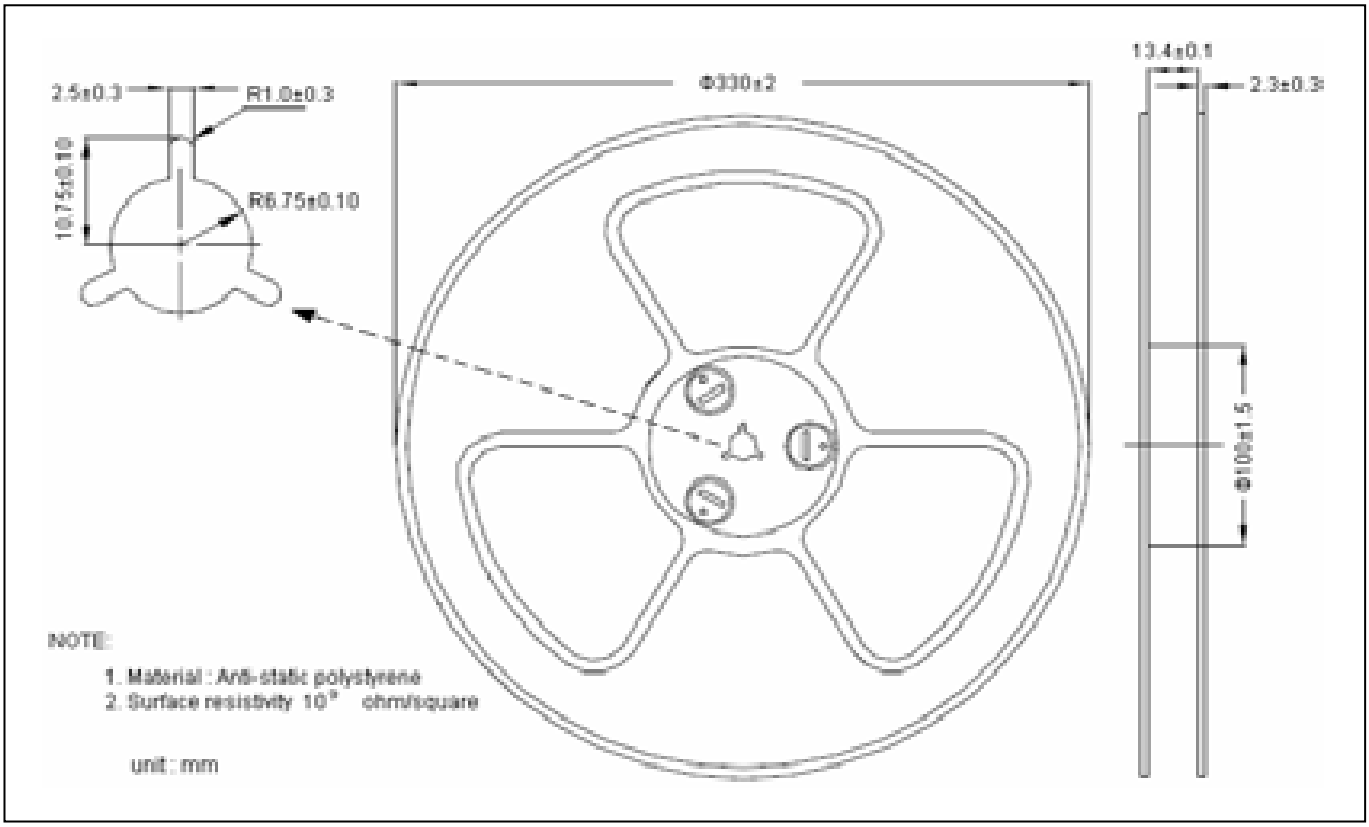


Typical Characteristics(Cont.) : Q2(P-channel)

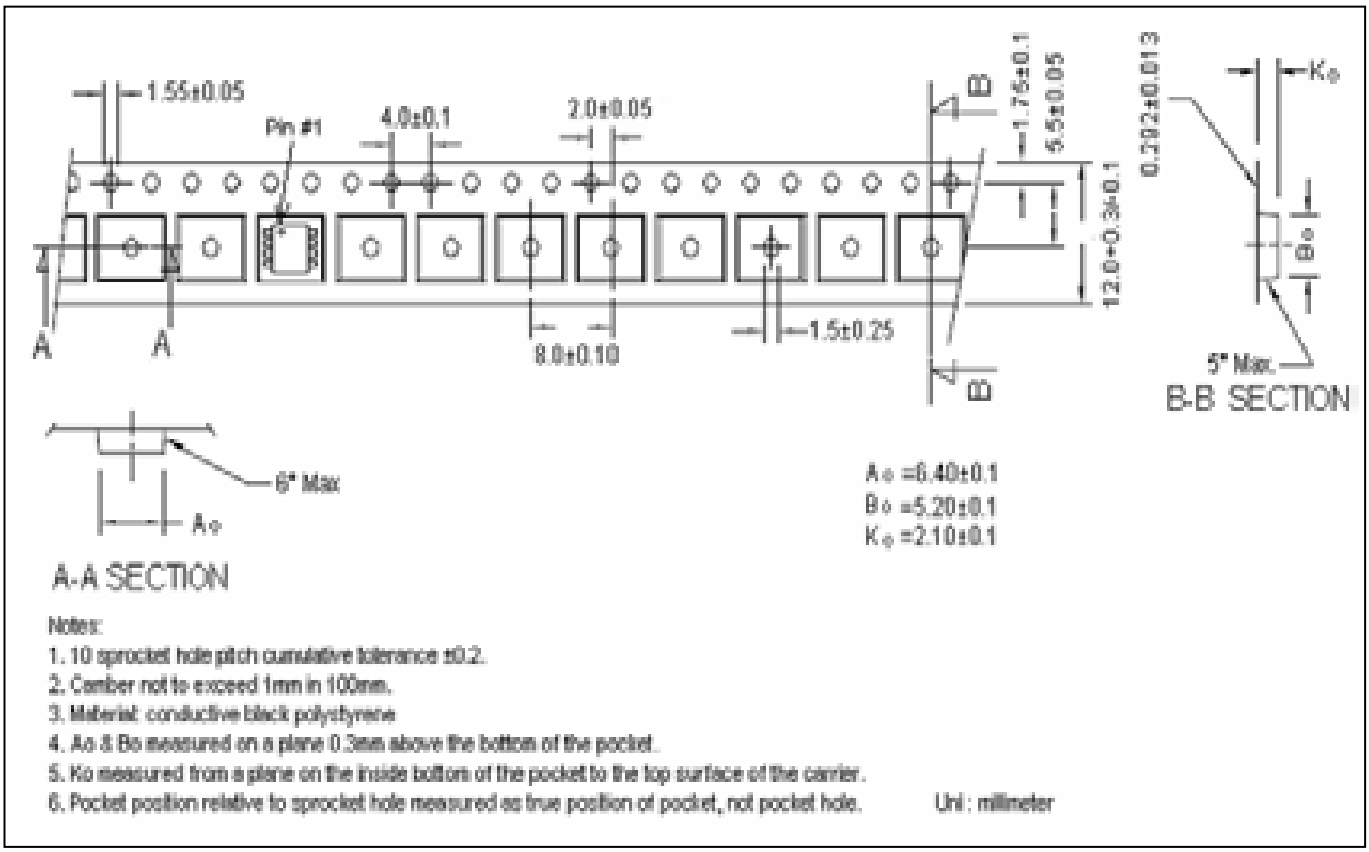




Reel Dimension



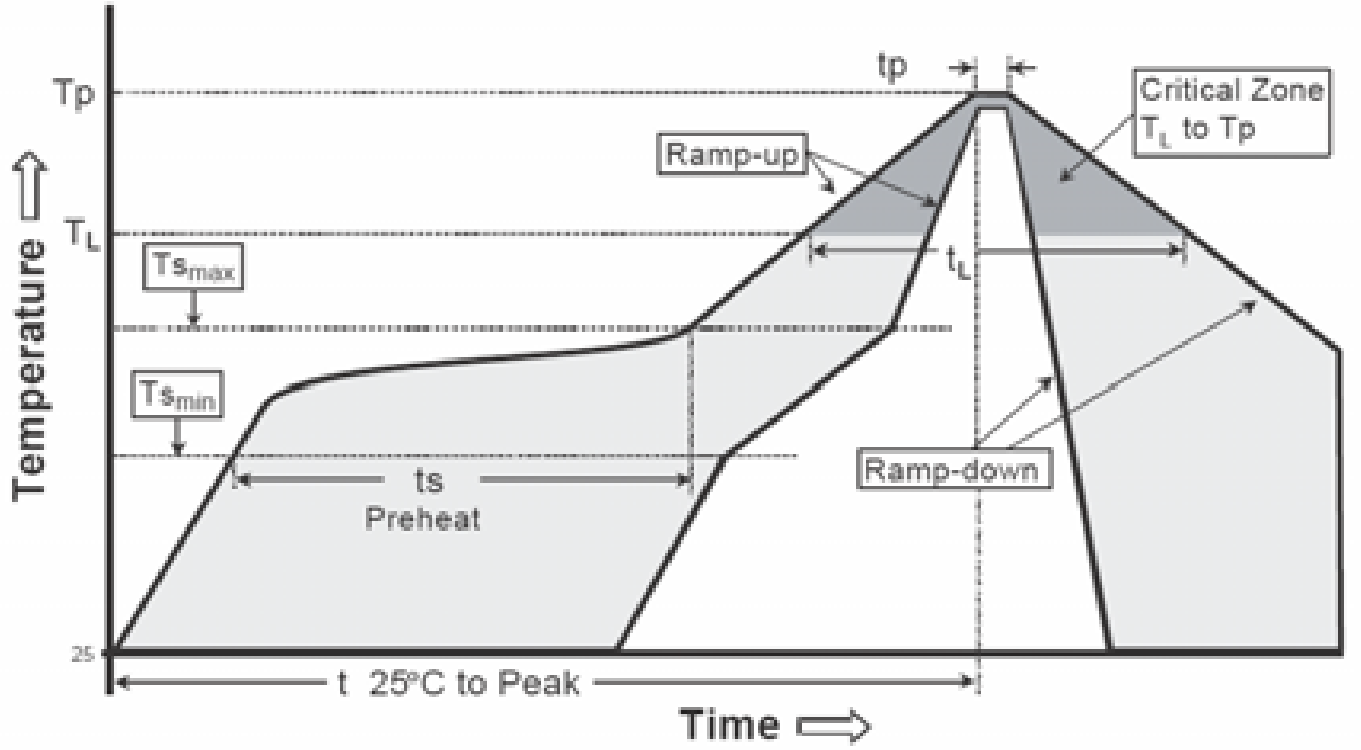
Carrier Tape Dimension



Recommended wave soldering condition

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

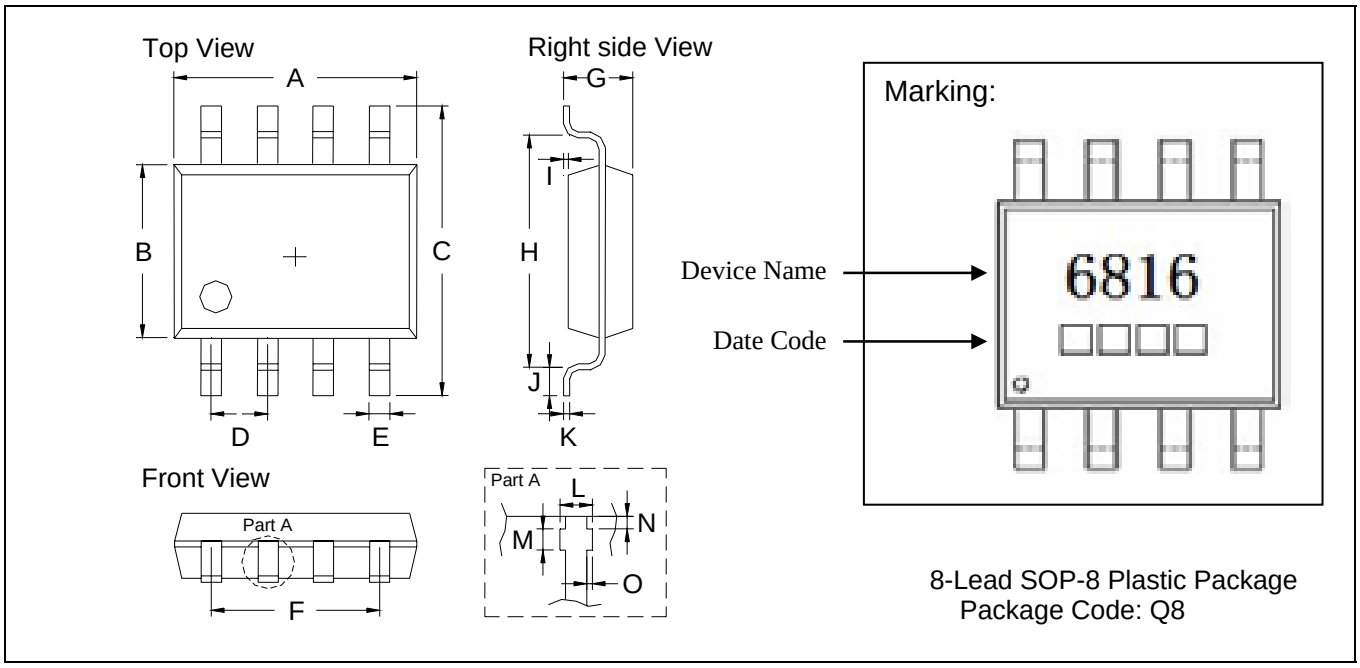
Recommended temperature profile for IR reflow



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(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 : All temperatures refer to topside of the package, measured on the package body surface.

SOP-8 Dimension



*: Typical

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1909	0.2007	4.85	5.10	I	0.0019	0.0078	0.05	0.20
B	0.1515	0.1555	3.85	3.95	J	0.0118	0.0275	0.30	0.70
C	0.2283	0.2441	5.80	6.20	K	0.0074	0.0098	0.19	0.25
D	0.0480	0.0519	1.22	1.32	L	0.0145	0.0204	0.37	0.52
E	0.0145	0.0185	0.37	0.47	M	0.0118	0.0197	0.30	0.50
F	0.1472	0.1527	3.74	3.88	N	0.0031	0.0051	0.08	0.13
G	0.0570	0.0649	1.45	1.65	O	0.0000	0.0059	0.00	0.15
H	0.1889	0.2007	4.80	5.10					

Notes: 1.Controlling dimension: millimeters.
2.Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.

Material:

- Lead: Pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.