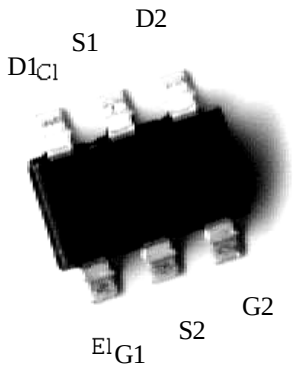
N- AND P-Channel Enhancement Mode MOSFET

TSOP-6



Features:

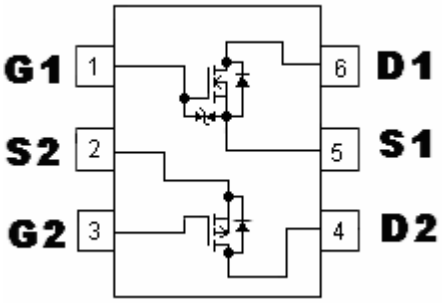
- Simple drive requirement
- Low gate charge
- Low on-resistance
- Fast switching speed
- Pb-free lead plating and halogen-free package

Description

The KTC2605 consists of a N-channel and a P-channel enhancement-mode MOSFET in a single TSOP-6 package, providing the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.
The TSOP-6 package is universally preferred for all commercial-industrial surface mount applications.

	N-CH	P-CH
BV_{DSS}	20V	-20V
I_D	5A(V_{GS}=4.5V)	-2.9A(V_{GS}=-4.5 V)
$R_{DSON(TYP.)}$	23mΩ(V_{GS}=4.5V)	79mΩ(V_{GS}=-4.5V)
	30mΩ(V_{GS}=2.5V)	117mΩ(V_{GS}=-2.5V)
	46mΩ(V_{GS}=1.8V)	160mΩ(V_{GS}=-1.8V)

Equivalent Circuit



G：Gate
S：Source
D：Drain

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Limits		Unit
			N-channel	P-channel	
Drain-Source Breakdown Voltage		BV_{DSS}	20	-20	V
Gate-Source Voltage		V_{GS}	±8	±8	V
Continuous Drain Current (Note 1)	T_A=25°C ,V_{GS}=4.5V(N-CH), V_{GS}=-4.5V(P-CH)	I_D	5	-2.9	A
	T_A=70°C, V_{GS}=4.5V(N-CH), V_{GS}=-4.5V(P-CH)	I_D	4	-2.3	A
Pulsed Drain Current (Note 2)		I_{DM}	20	-11.6	A
Total Power Dissipation (Note 1)		Pd	1.25		W
Linear Derating Factor			0.01		W / °C
Operating Junction and Storage Temperature		Tj, Tstg	-55~+150		°C
Thermal Resistance, Junction-to-Ambient (Note 1)		Rth,ja	110		°C/W

Note : 1.Surface mounted on 1 in² copper pad of FR-4 board, t≤5 sec; 180°C/W when mounted on minimum copper pad.
2.Pulse width limited by maximum junction temperature.

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	20	-	-	V	V_{GS}=0, I_D=250μA
$V_{GS(th)}$	0.4	0.6	1.2		V_{DS}=V_{GS}, I_D=250μA
I_{GSS}	-	-	±20	μA	V_{GS}=±8V, V_{DS}=0
I_{DSS}	-	-	1		V_{DS}=20V, V_{GS}=0
I_{DSS}	-	-	25		V_{DS}=16V, V_{GS}=0, Tj=70°C
*$R_{DS(ON)}$	-	23	30	mΩ	V_{GS}=4.5V, I_D=5A
	-	30	40		V_{GS}=2.5V, I_D=2.6A
	-	46	60		V_{GS}=1.8V, I_D=2A
*G_{FS}	-	13	-	S	V_{DS}=5V, I_D=5A
Dynamic					
Ciss	-	509	-	pF	V_{DS}=10V, V_{GS}=0, f=1MHz
Coss	-	100	-		
Crss	-	81	-		
*$t_{d(ON)}$	-	6	-	ns	V_{DS}=10V, I_D=1A, V_{GS}=4.5V, R_G=3.3Ω
*t_r	-	19	-		
*$t_{d(OFF)}$	-	12	-		
*t_f	-	10	-		
*Qg	-	7	-	nC	V_{DS}=10V, I_D=5A, V_{GS}=4.5V
*Qgs	-	0.9	-		
*Qgd	-	2.4	-		
Source-Drain Diode					
*V_{SD}	-	0.77	1.2	V	V_{GS}=0V, I_S=1.2A
*trr	-	14	-	ns	I_S=5A, V_{GS}=0V, dI/dt=100A/μs
*Qrr	-	7	-	nC	

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

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

Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static					
BV_{DSS}	-20	-	-	V	V_{GS}=0, I_D=-250μA
$V_{GS(th)}$	-0.4	-0.8	-1.2		V_{DS}=V_{GS}, I_D=-250μA
I_{GSS}	-	-	±100	nA	V_{GS}=±8V, V_{DS}=0
I_{DSS}	-	-	-1	μA	V_{DS}=-20V, V_{GS}=0
I_{DSS}	-	-	-10		V_{DS}=-16V, V_{GS}=0, Tj=70°C
*$R_{DS(ON)}$	-	79	105	mΩ	V_{GS}=-4.5V, I_D=-2.8A
	-	117	155		V_{GS}=-2.5V, I_D=-2A
	-	160	210		V_{GS}=-1.8V, I_D=-1A
*G_{FS}	-	6	-	S	V_{DS}=-5V, I_D=-2.8A
Dynamic					
Ciss	-	446	-	pF	V_{DS}=-10V, V_{GS}=0, f=1MHz
Coss	-	57	-		
Crss	-	52	-		
*$t_{d(ON)}$	-	9.2	-	ns	V_{DD}=-10V, I_D=-1A, V_{GS}=-4.5V, R_G=6Ω
*t_r	-	7.3	-		
*$t_{d(OFF)}$	-	38	-		
*t_f	-	12	-		
*Qg	-	5	-	nC	V_{DS}=-10V, I_D=-2A, V_{GS}=-4.5V
*Qgs	-	0.6	-		
*Qgd	-	2.5	-		
Source-Drain Diode					
*V_{SD}	-	-0.86	-1.2	V	V_{GS}=0V, I_S=-1.6A
*trr	-	26	-	ns	I_S=-2.9A, V_{GS}=0V, dI/dt=100A/μs
*Qrr	-	5	-	nC	

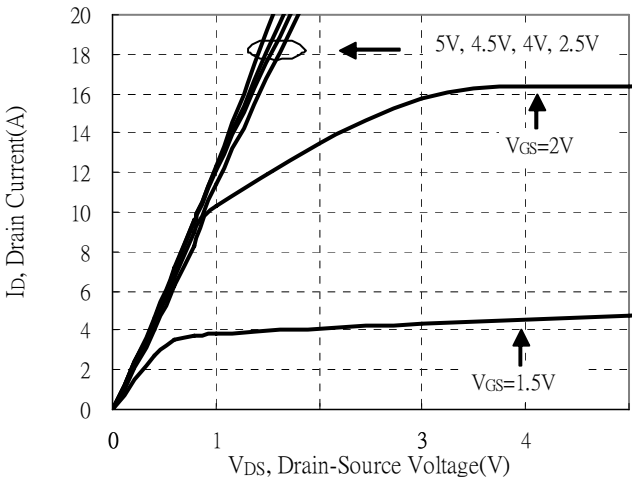
*Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

Ordering Information

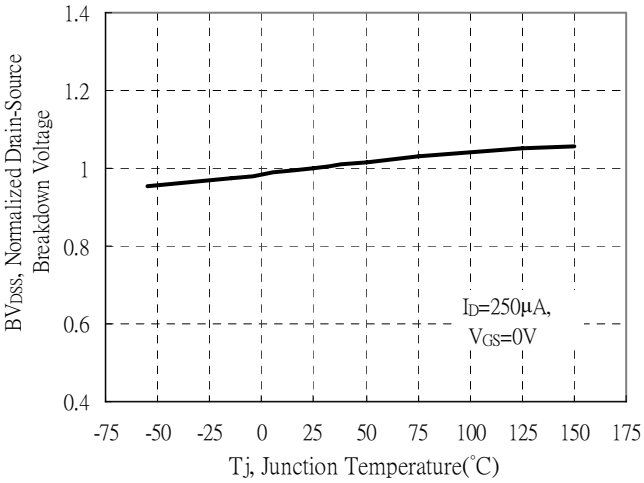
Device	Package	Shipping
KTC2605	TSOP-6 (Pb-free lead plating and halogen-free package)	3000 pcs / Tape & Reel

N-channel Typical Characteristics

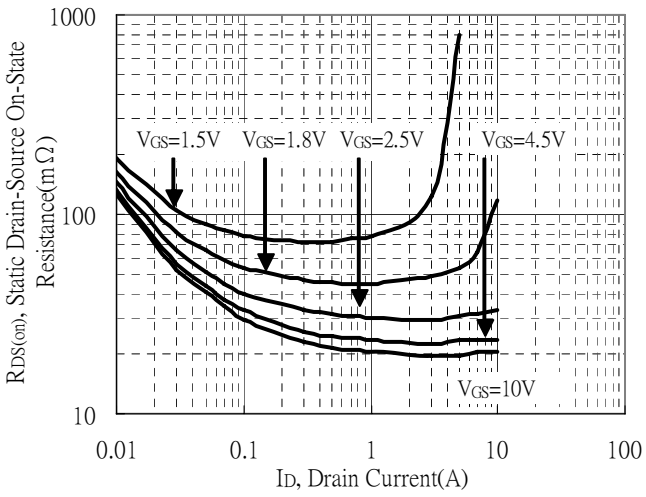
Typical Output Characteristics



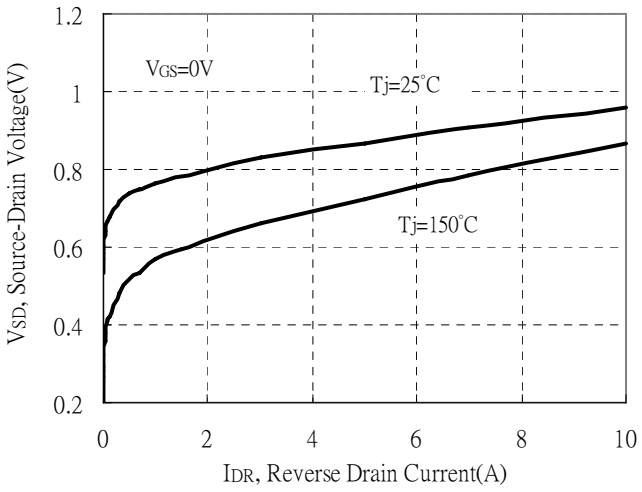
Brekdown Voltage vs Ambient Temperature



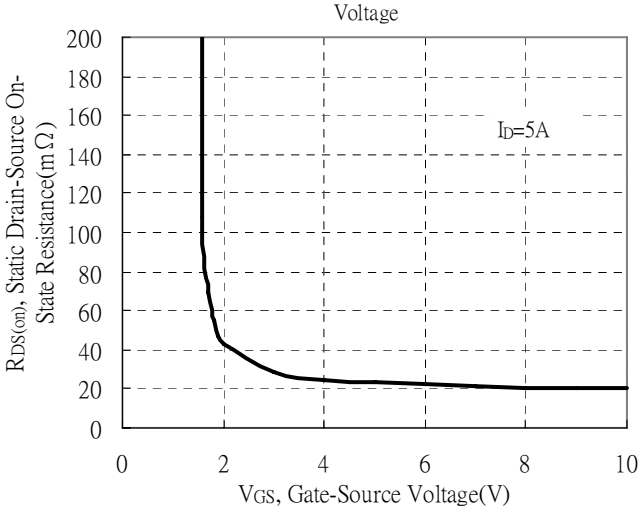
Static Drain-Source On-State resistance vs Drain Current



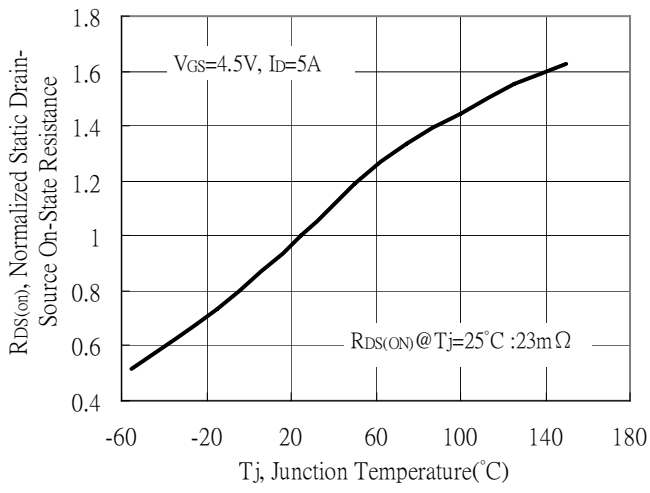
Reverse Drain Current vs Source-Drain Voltage



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

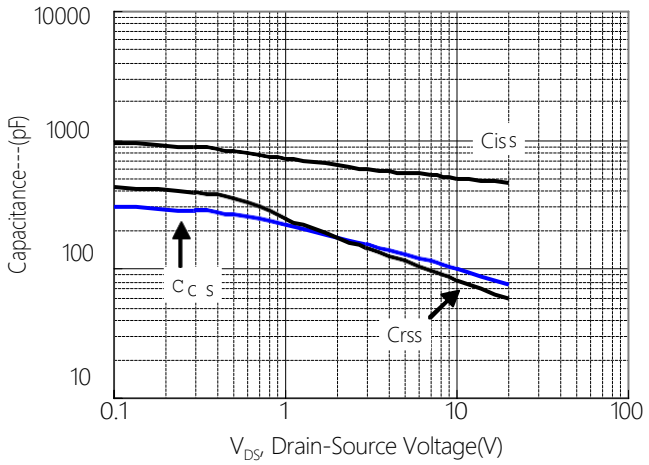


Drain-Source On-State Resistance vs Junction Tempearture

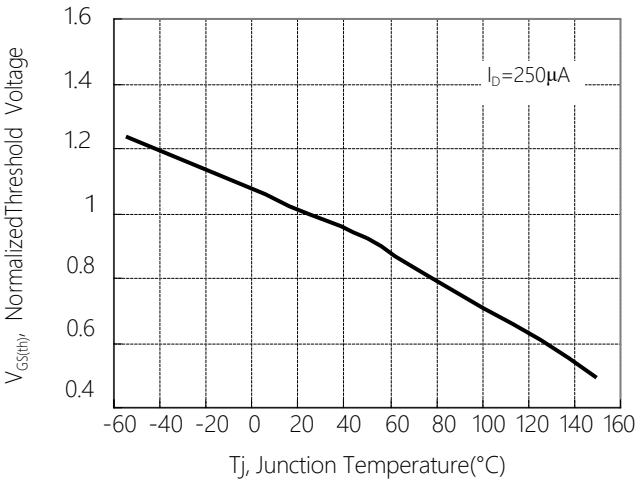


N-channel Typical Characteristics(Cont.)

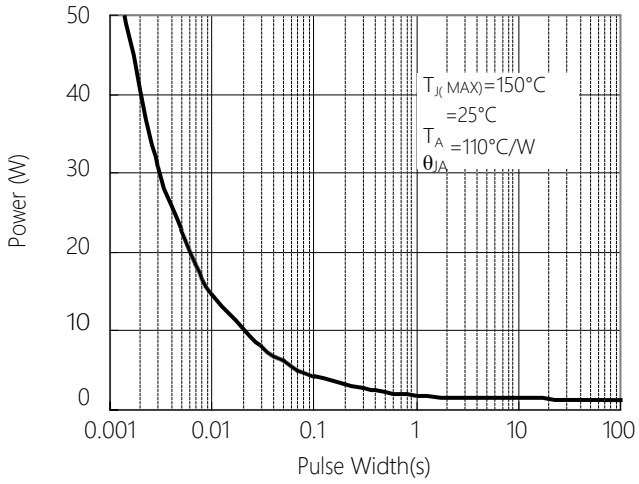
Capacitance vs Drain-to-Source Voltage



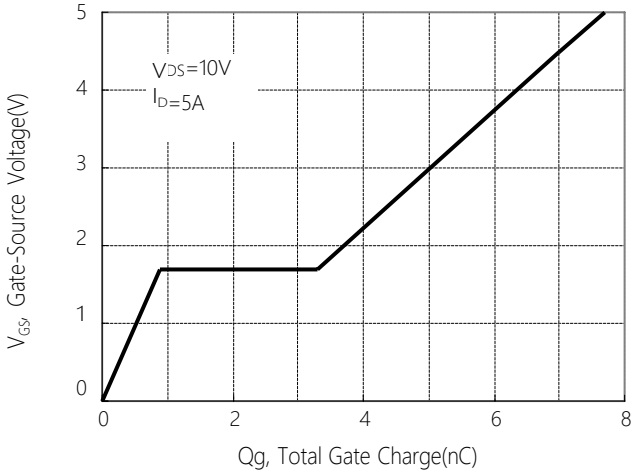
Threshold Voltage vs Junction Tempearture



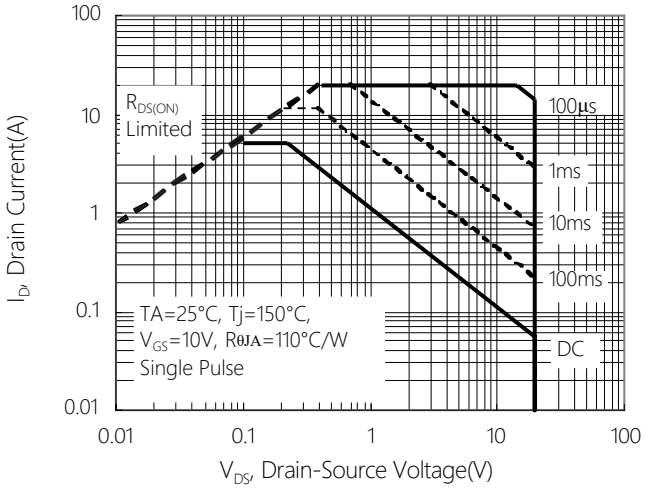
Single Pulse Power Rating, Junction to Ambient



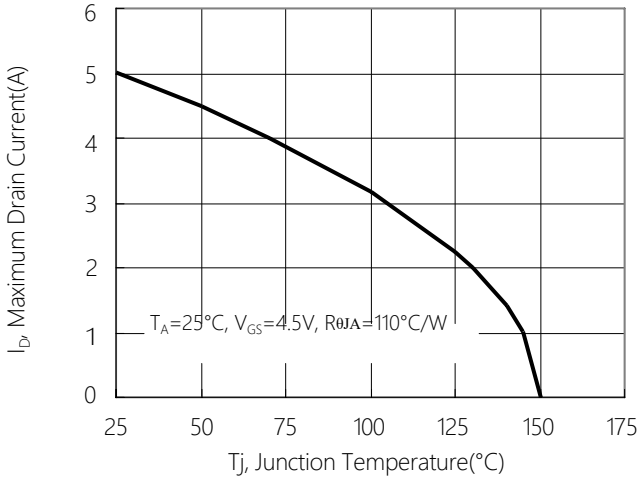
Gate Charge Characteristics



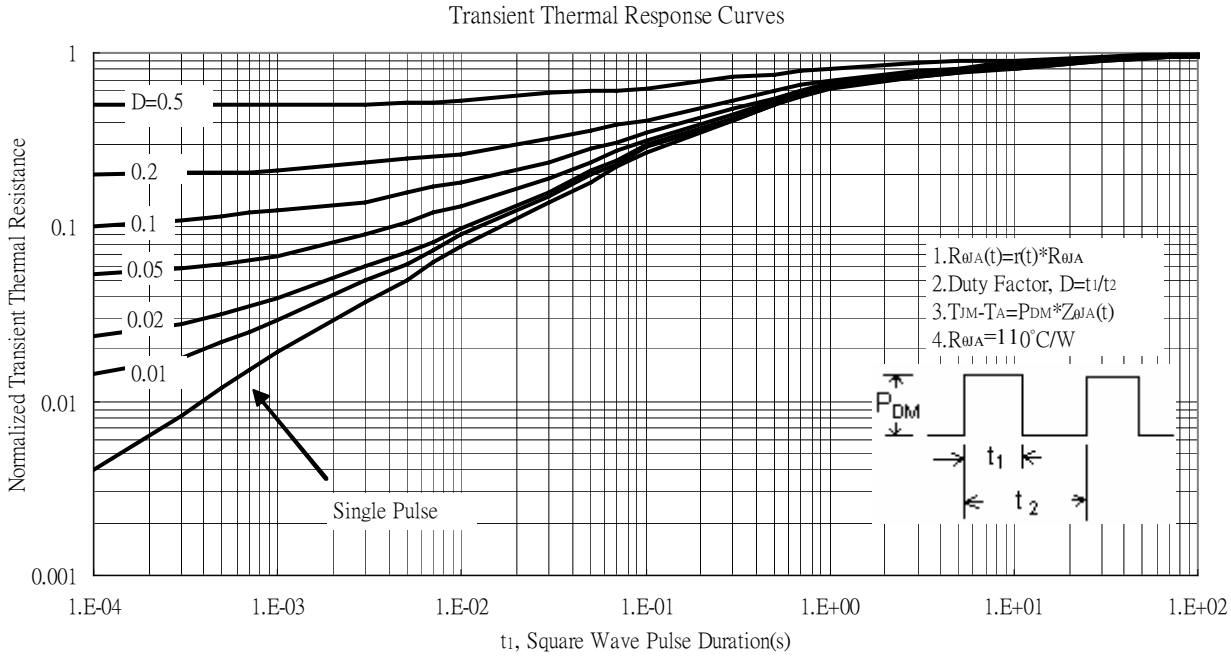
Maximum Safe Operating Area



Maximum Drain Current vs JunctionTemperature

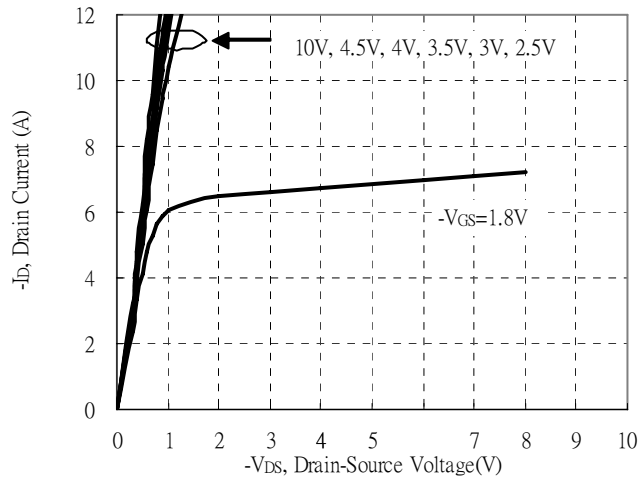


N-channel Typical Characteristics(Cont.)

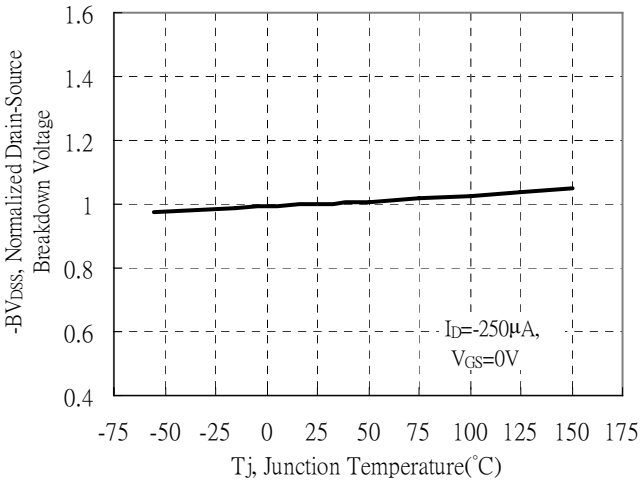


P-channel Typical Characteristics

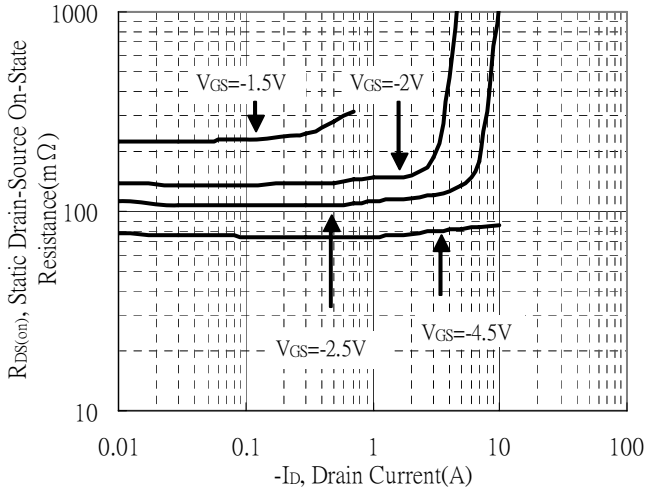
Typical Output Characteristics



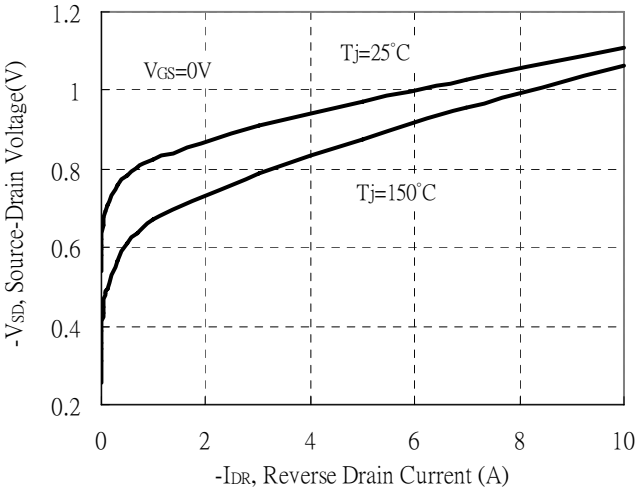
Brekdown Voltage vs Ambient Temperature



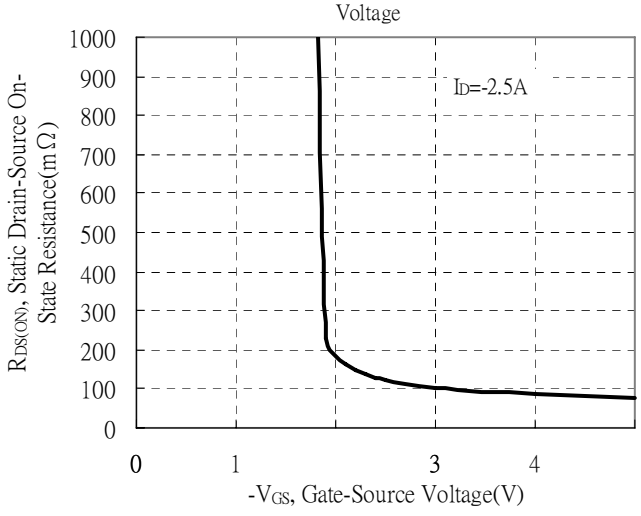
Static Drain-Source On-State resistance vs Drain Current



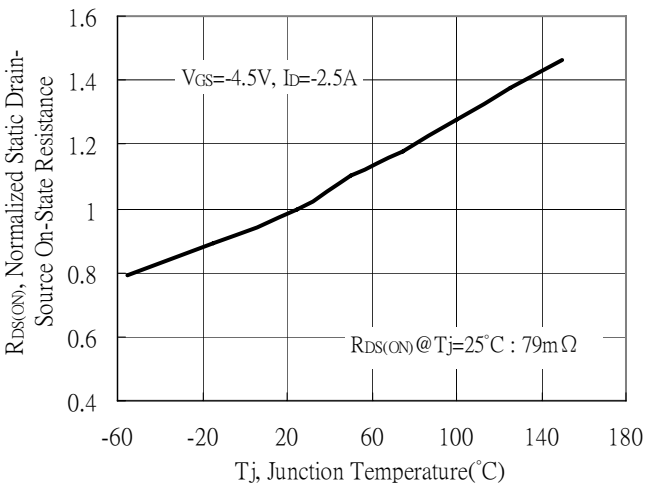
Reverse Drain Current vs Source-Drain Voltage



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

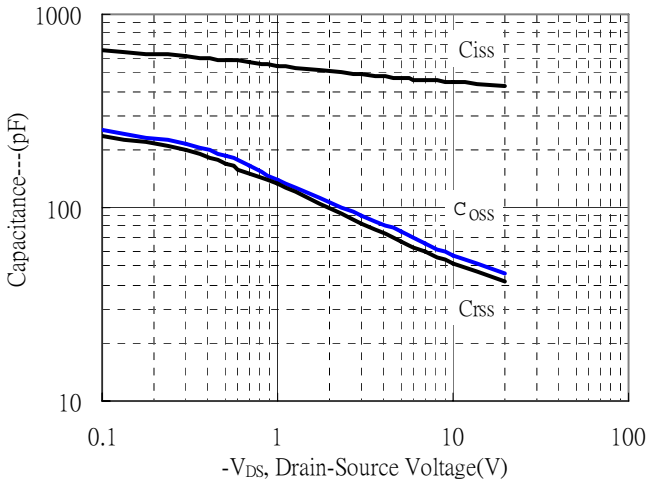


Drain-Source On-State Resistance vs Junction Tempearture

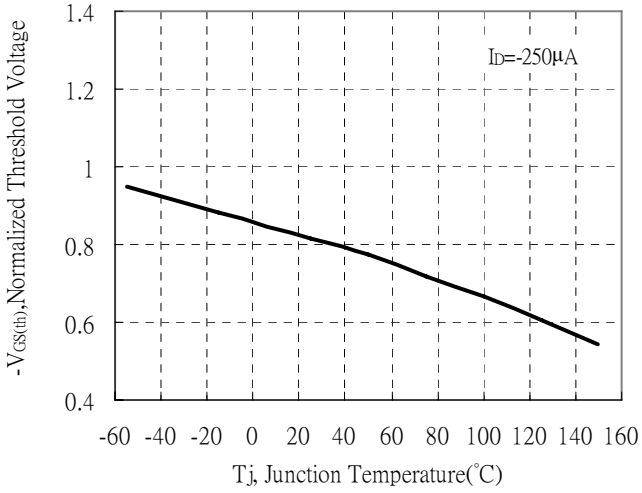


P-channel Typical Characteristics(Cont.)

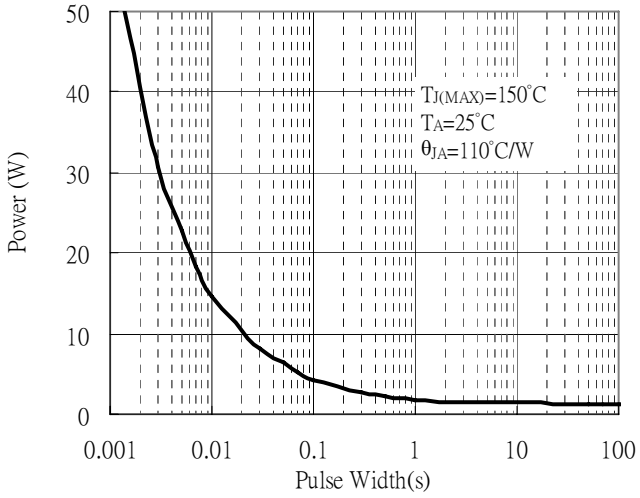
Capacitance vs Drain-to-Source Voltage



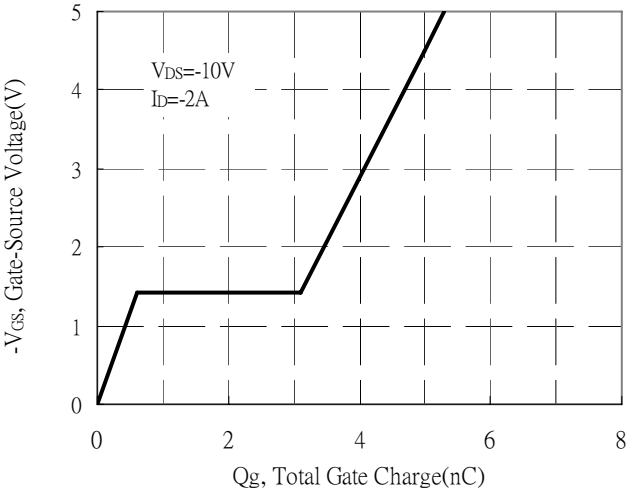
Threshold Voltage vs Junction Tempearture



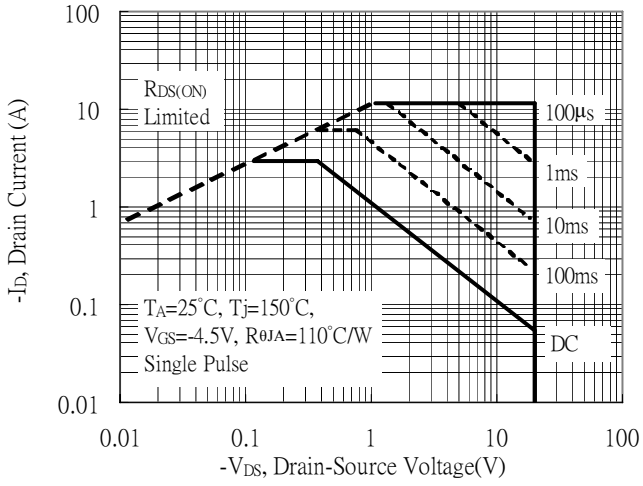
Single Pulse Power Rating, Junction to Ambient



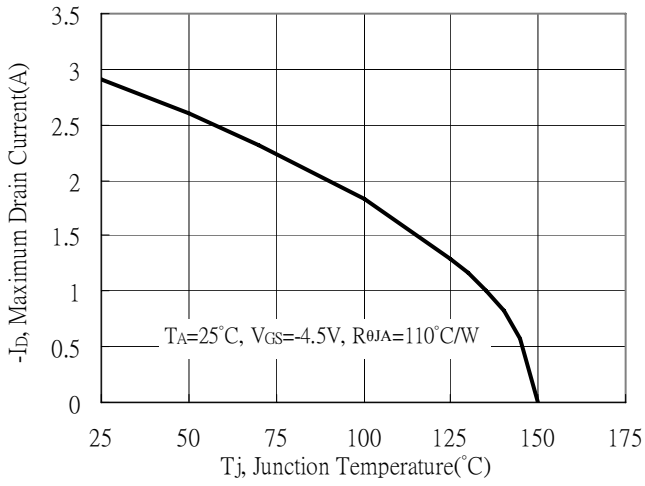
Gate Charge Characteristics



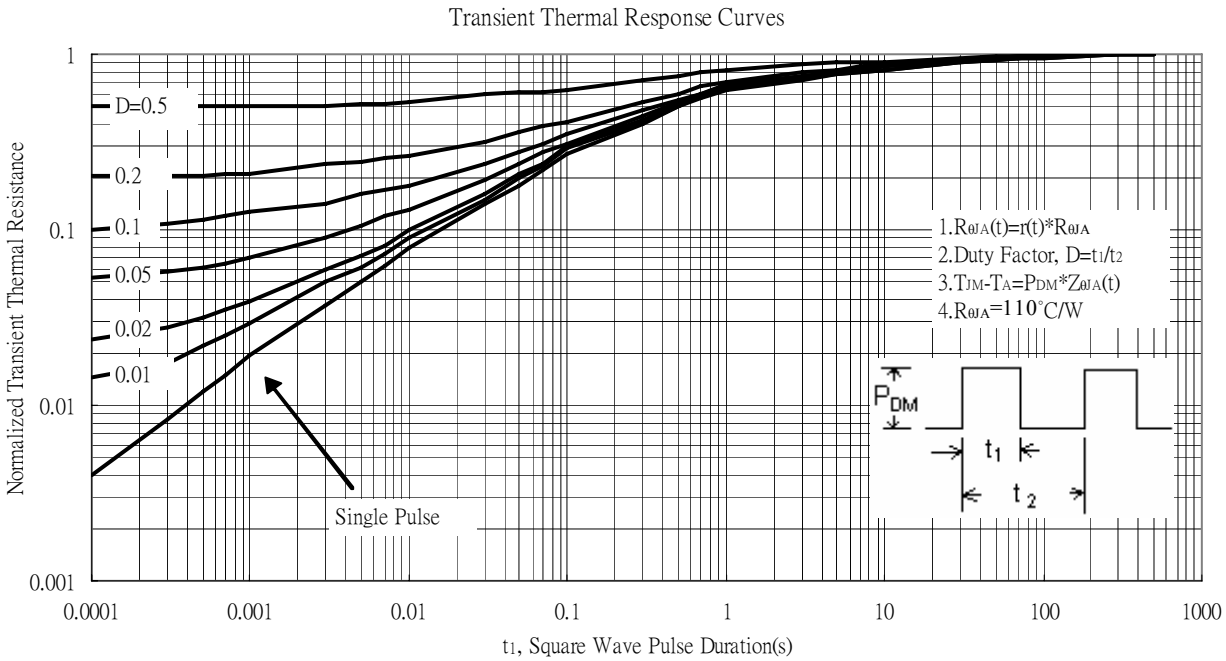
Maximum Safe Operating Area



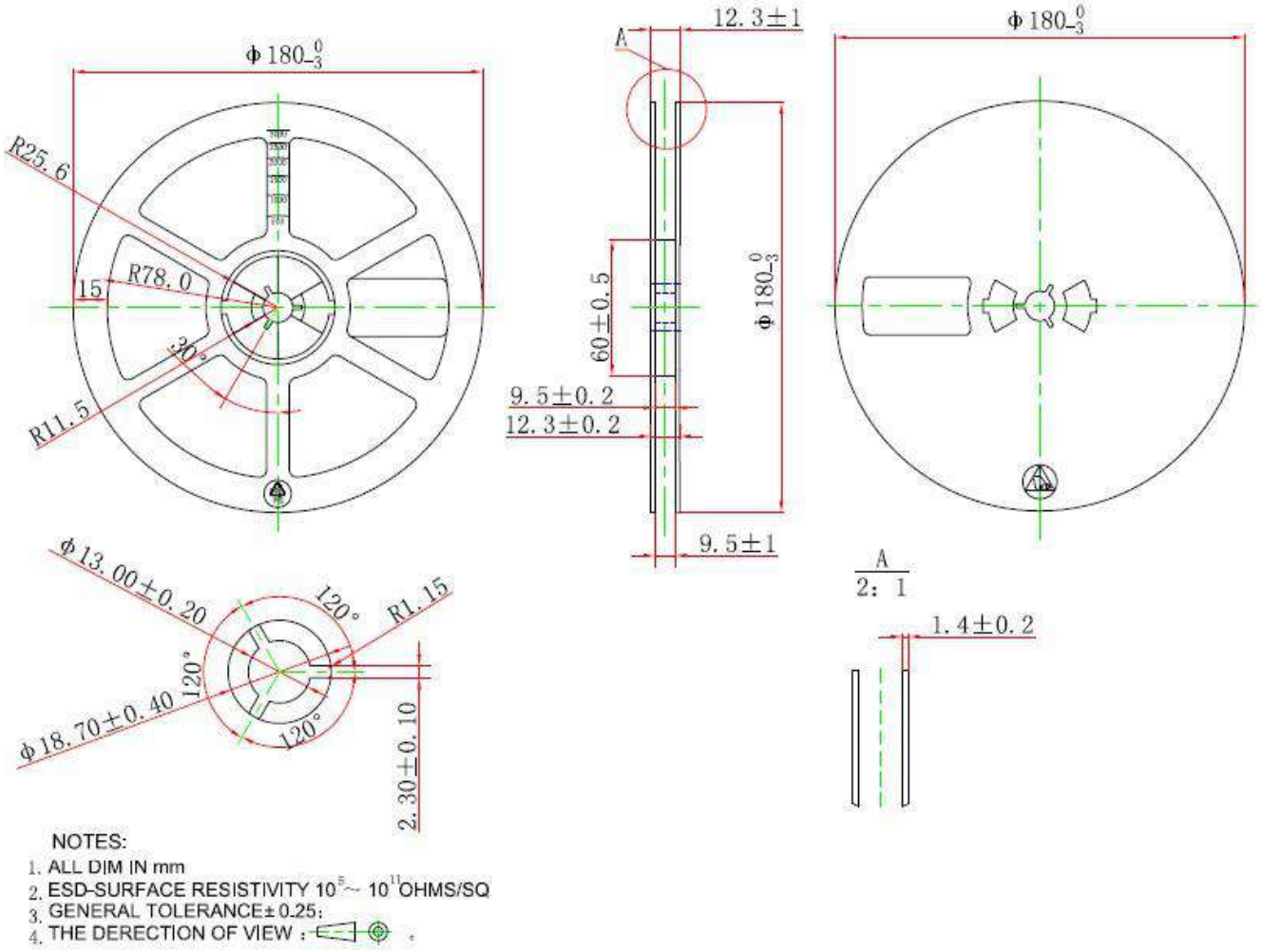
Maximum Drain Current vs JunctionTemperature



P-channel Typical Characteristics(Cont.)

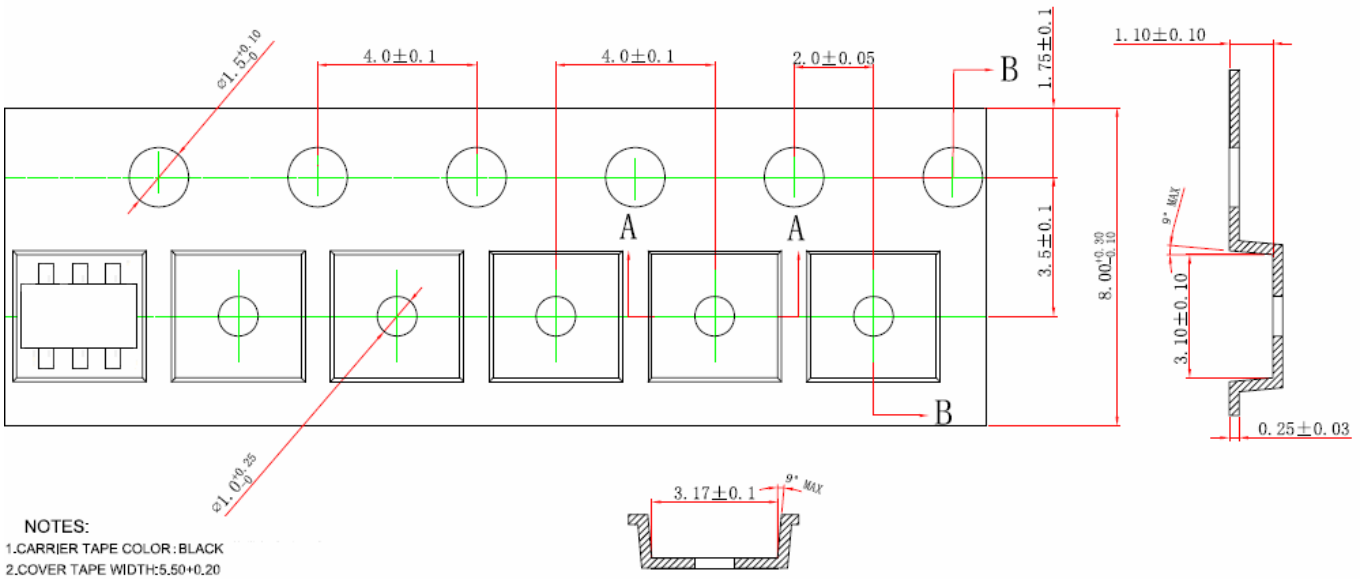


Reel Dimension



NOTES:
1. ALL DIM IN mm
2. ESD-SURFACE RESISTIVITY 10^5~ 10^{11}OHMS/SQ
3. GENERAL TOLERANCE± 0.25;
4. THE DERECTION OF VIEW :

Carrier Tape Dimension

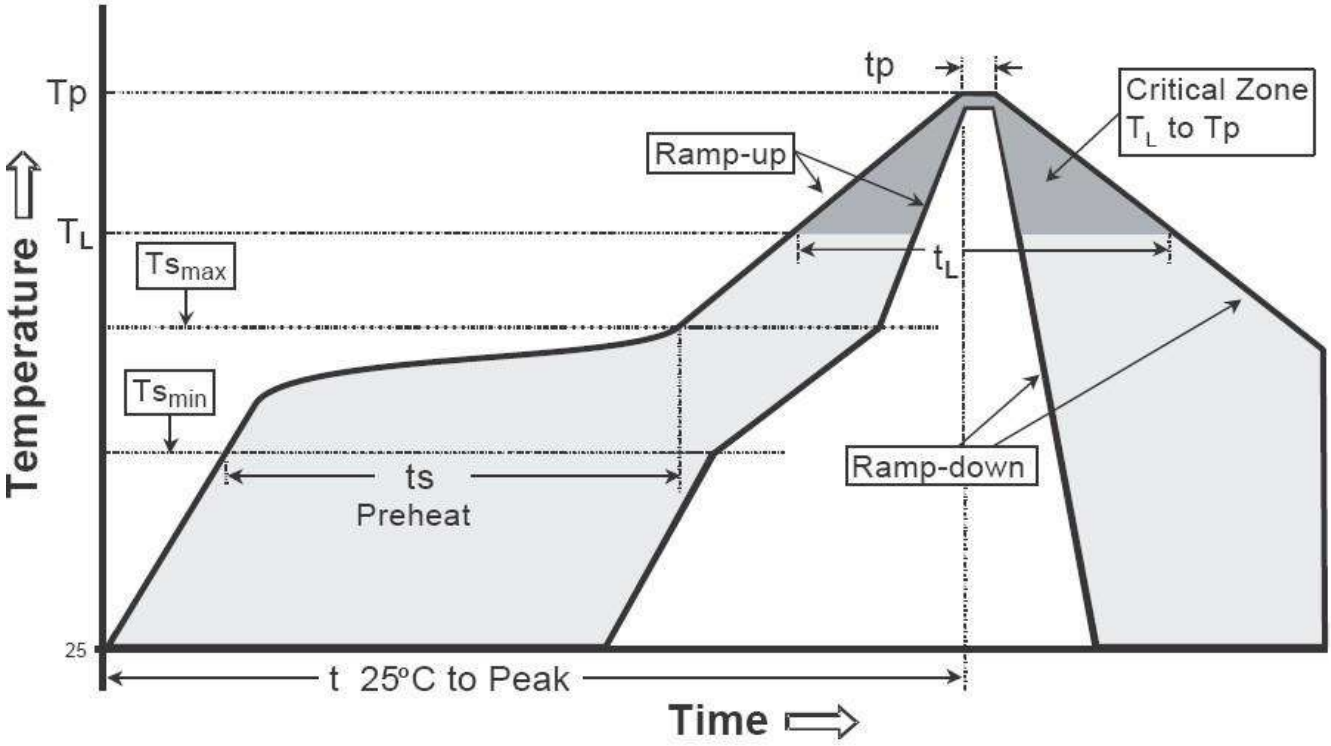


NOTES:
1.CARRIER TAPE COLOR:BLACK
2.COVER TAPE WIDTH:5.50+0.20
3.COVER TAPE COLOR:TRANSPARENT
5. ANTISTATIC COATED 10^{5}~ 10^{11}OHMS/SQ.
6.10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.20MAX.
7.CAMBER NOT TO EXCEED 1 MM IN 100 MM
8. ALL DIMS IN mm.
9. THE DERECTION OF VIEW:

Recommended wave soldering condition

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

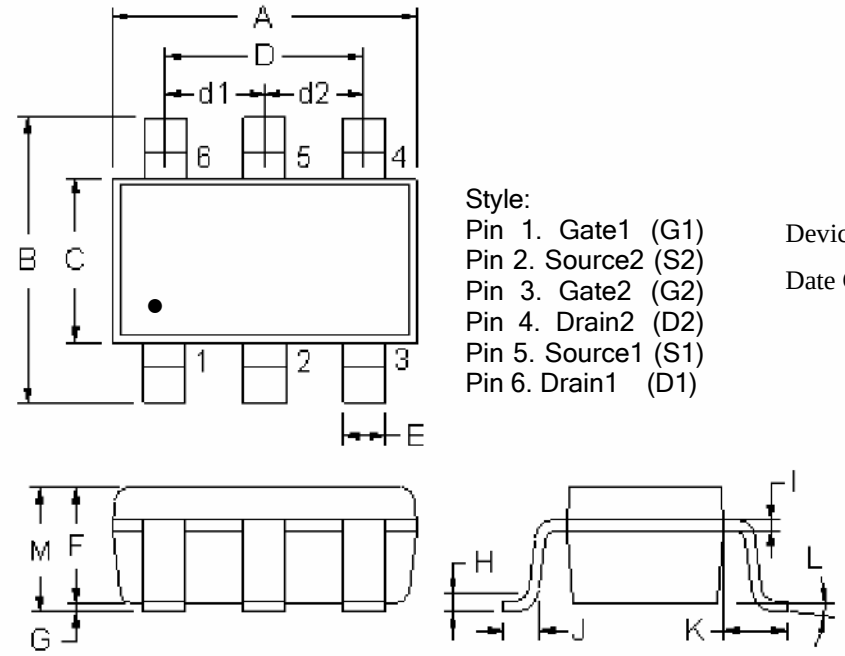
Recommended temperature profile for IR reflow



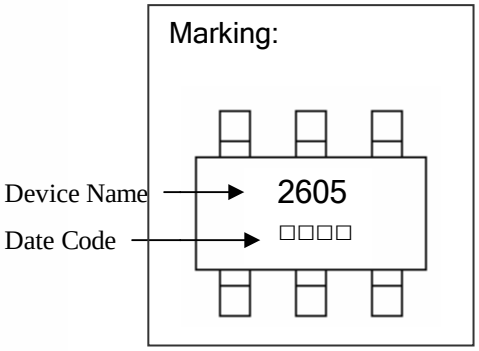
Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C/second max.	3°C/second max.
Preheat −Temperature Min(Ts min) −Temperature Max(Ts max) −Time(ts min to ts max)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
Time maintained above: −Temperature (TL)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

TSOP-6 Dimension



Style:
Pin 1. Gate1 (G1)
Pin 2. Source2 (S2)
Pin 3. Gate2 (G2)
Pin 4. Drain2 (D2)
Pin 5. Source1 (S1)
Pin 6. Drain1 (D1)



6-Lead TSOP-6 Plastic
Surface Mounted Package

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.1063	0.1220	2.70	3.10	G	0	0.0039	0	0.10
B	0.1024	0.1181	2.60	3.00	H	-	0.0098	-	0.25
C	0.0551	0.0709	1.40	1.80	I	0.0047 REF		0.12 REF	
D	0.0748 REF		1.90 REF		J	0.0177 REF		0.45 REF	
d1	0.0374 REF		0.95 REF		K	0.0236 REF		0.60 REF	
d2	0.0374 REF		0.95 REF		L	0°	10°	0°	10°
E	0.0118	0.0197	0.30	0.50	M	-	0.0433	-	1.10
F	0.0276	0.0394	0.70	1.00					