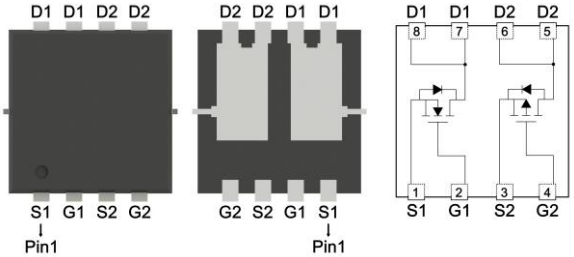
Product Summary

	N-CH	P-CH	
BV_{DSS}	30	-30	V
$R_{DS(ON)}$ typ. @ V_{GS}=(-)10V	15	35	mΩ
$R_{DS(ON)}$ typ. @ V_{GS}=(-)4.5V	20	52	
I_D @ V_{GS}=(-)10V, T_C=25°C	11	-11	A
I_D @ V_{GS}=(-)10V, T_A=25°C	7.3	-5	

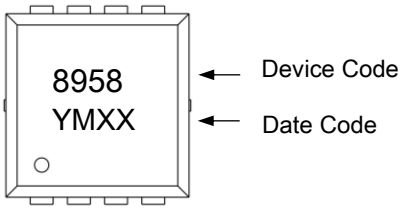
Features

- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and halogen-free

DFN3×3



Marking



YM: Date Code Marking
Y: Year Code, the last digit of Christian year
M: Month Code

A: Jan	B: Feb	C: Mar	D: Apr	E: May	F: Jun
G: Jul	H: Aug	J: Sep	K: Oct	L: Nov	M: Dec

XX: Production Serial Number, 01~99

Ordering Information

Device	Package	Shipping
MTC8958V8-0-T6-G	DFN3×3	3000pcs / Tape & Reel

0: Product rank, zero for no rank products.
T6: Packing spec, T6 : 3000pcs / tape & reel, 13" reel
G: Environment friendly grade: S for RoHS compliant products, G for RoHS compliant and green compound products.

Absolute Maximum Ratings (T_A=25°C)

Parameter		Symbol	Value N-CH	Value P-CH	Unit
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	22	-16	A
Continuous Drain Current @ V_{GS}=10V, T_C=25°C (package limit)	*a		11	-11	
Continuous Drain Current @ V_{GS}=(-)10V, T_C=100°C	*a		11	-10	
Continuous Drain Current @ V_{GS}=(-)10V, T_A=25°C	*b		7.3	-5	
Continuous Drain Current @ V_{GS}=(-)10V, T_A=70°C	*b		5.9	-4	
Pulsed Drain Current	*c	I_{DM}	44	-44	
Continuous Body Diode Forward Current @ T_C=25°C		I_S	11	-11	
Pulsed Body Diode Forward Current @ T_C=25°C		I_{SM}	44	-44	
Avalanche Current @ L=0.1mH		I_{AS}	10	-9	
Avalanche Energy @ L=0.5mH		E_{AS}	9	6.3	mJ
Total Power Dissipation	T_C=25°C *a	P_D	18		W
	T_C=100°C *a		7.2		
	T_A=25°C *b		1.9		
	T_A=70°C *b		1.2		
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150		°C
Steady State Thermal Resistance, Junction-to-Ambient		$R_{\theta JC}$	7		°C/W
Steady State Thermal Resistance, Junction-to-Ambient	*b	$R_{\theta JA}$	65		

N-Channel 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	-	2.5		V_{DS}=V_{GS}, I_D=250μA
G_{FS}	-	4.6	-	S	V_{DS}=10V, I_D=3A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
$R_{DS(ON)}$	-	15	20	mΩ	V_{GS}=10V, I_D=5A
	-	20	28		V_{GS}=4.5V, I_D=4A
Dynamic					
C_{iss}	-	560	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
C_{oss}	-	75	-		
C_{rss}	-	55	-		
Rg	-	3.3	-	Ω	f=1MHz
Q_g *d,e	-	6	-	nC	V_{DS}=15V, I_D=5A, V_{GS}=4.5V
Q_g *d,e	-	12	-		V_{DS}=15V, I_D=5A, V_{GS}=10V
Q_{gs} *d,e	-	2	-		
Q_{gd} *d,e	-	2.3	-		
$t_{d(ON)}$ *d,e	-	6.3	-	ns	V_{DS}=15V, I_D=5A, V_{GS}=10V, R_{GS}=1Ω
tr *d,e	-	15	-		
$t_{d(OFF)}$ *d,e	-	26	-		
t_f *d,e	-	6	-		
Source-Drain Diode					
V_{SD} *d	-	0.84	1.2	V	I_S=5A, V_{GS}=0V
t_{rr}	-	7	-	ns	I_F=5A, di/dt=100A/μs
Q_{rr}	-	3	-	nC	

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.

*b. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz 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

*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

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

*e. Independent of operating temperature.

P-Channel 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	-	-2.5		V_{DS}=V_{GS}, I_D=-250μA
G_{FS}	-	4.2	-	S	V_{DS}=-10V, I_D=-3A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	-1	μA	V_{DS}=-24V, V_{GS}=0V
$R_{DS(ON)}$	-	35	46	mΩ	V_{GS}=-10V, I_D=-5A
	-	52	73		V_{GS}=-4.5V, I_D=-4A
Dynamic					
C_{iss}	-	650	-	pF	V_{DS}=-15V, V_{GS}=0V, f=1MHz
C_{oss}	-	75	-		
C_{rss}	-	65	-		
Rg	-	15	-	Ω	f=1MHz
Q_g *d,e	-	6.5	-	nC	V_{DS}=-15V, I_D=-5A, V_{GS}=-4.5V
Q_g *d,e	-	13	-		V_{DS}=-15V, I_D=-5A, V_{GS}=-10V
Q_{gs} *d,e	-	2.2	-		
Q_{gd} *d,e	-	2.5	-		
$t_{d(ON)}$ *d,e	-	5.8	-	ns	V_{DS}=-15V, I_D=-5A, V_{GS}=-10V, R_{GS}=1Ω
tr *d,e	-	16	-		
$t_{d(OFF)}$ *d,e	-	40	-		
t_f *d,e	-	9	-		
Source-Drain Diode					
V_{SD} *d	-	-0.89	-1.2	V	I_S=-5A, V_{GS}=0V
t_{rr}	-	7.3	-	ns	I_F=-5A, di/dt=100A/μs
Q_{rr}	-	3.1	-	nC	

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.

*b. The value of $R_{\theta JA}$ is measured with the device mounted on 1in² FR-4 board with 2oz 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

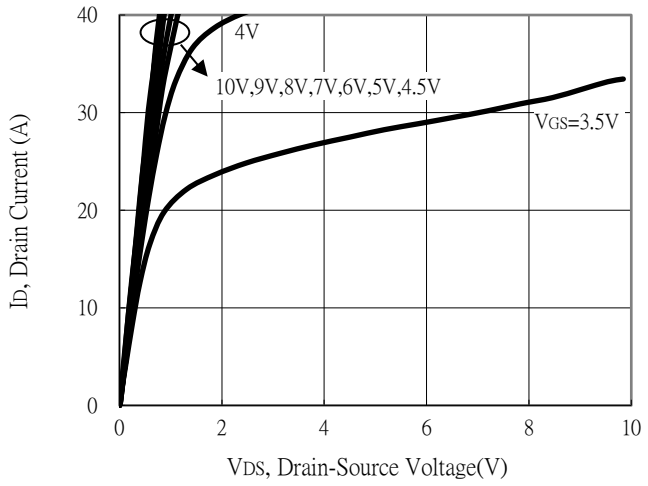
*c. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to

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

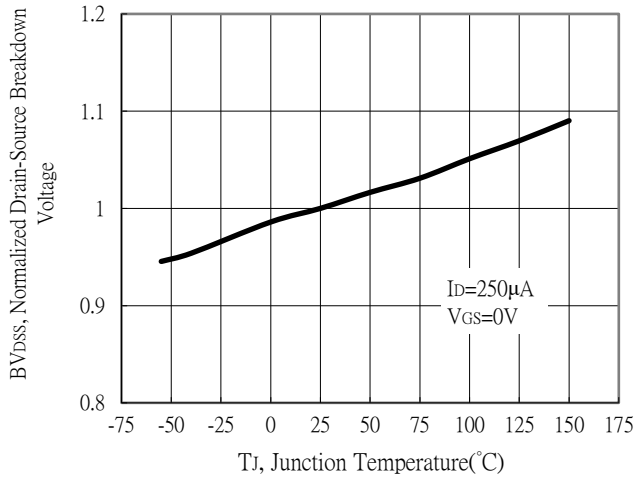
*e. Independent of operating temperature.

N-Channel Typical Characteristics

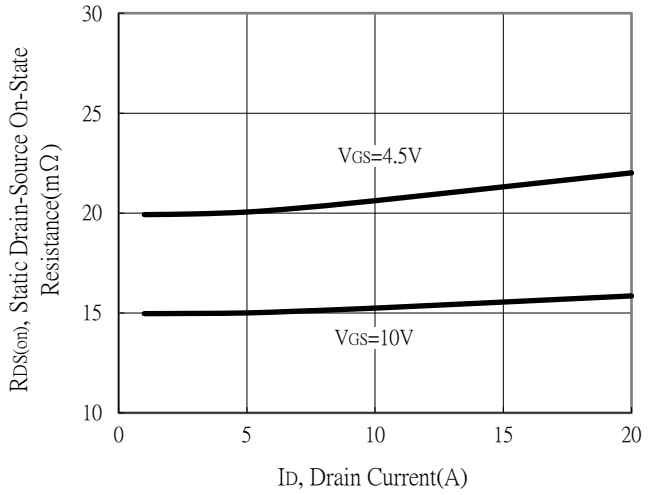
Typical Output Characteristics



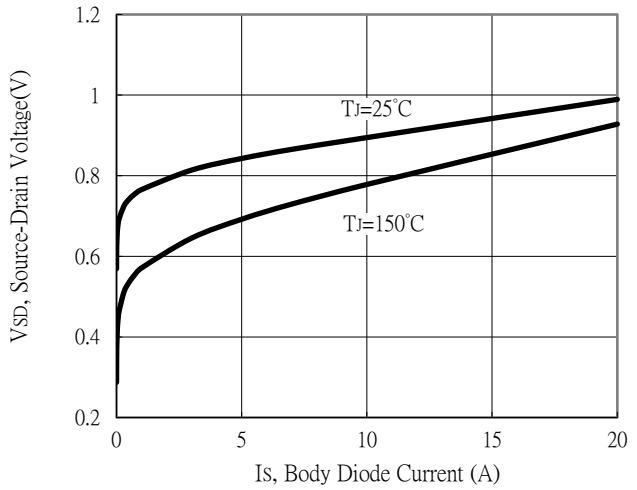
Breakdown Voltage vs Ambient Temperature



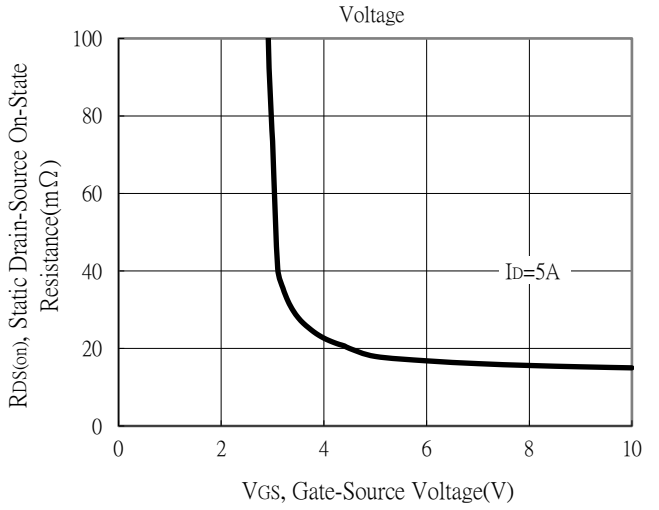
Static Drain-Source On-State resistance vs Drain Current



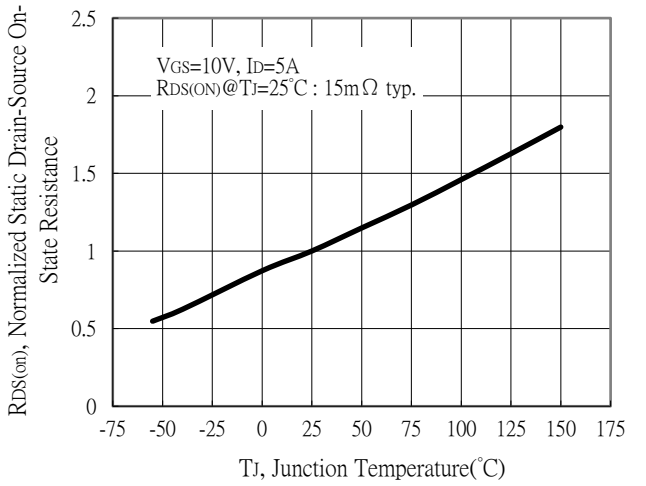
Body Diode Current vs Source-Drain Voltage



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

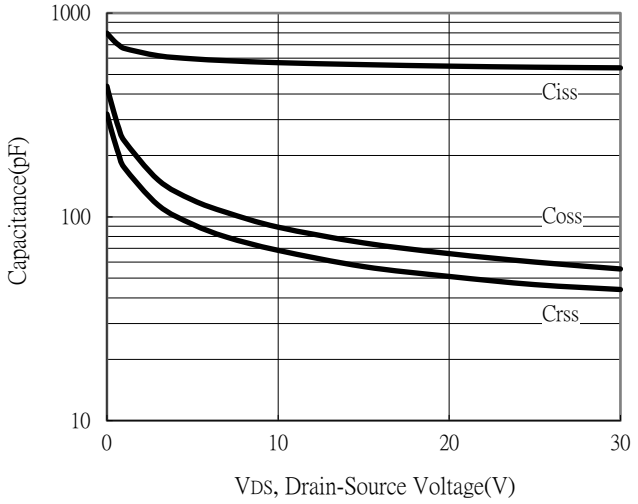


Drain-Source On-State Resistance vs Junction Temperature

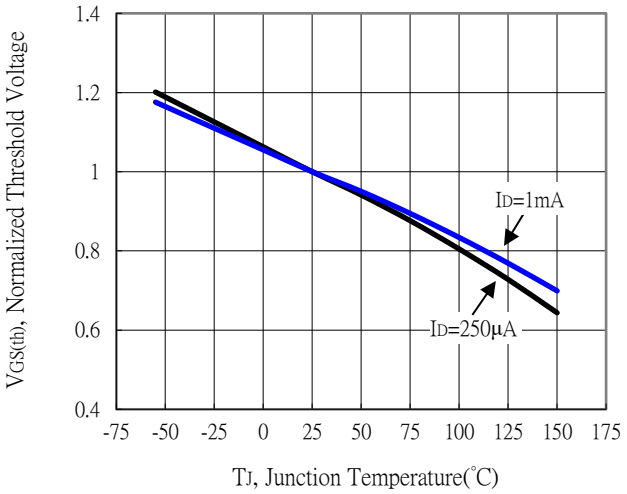


N-Channel Typical Characteristics

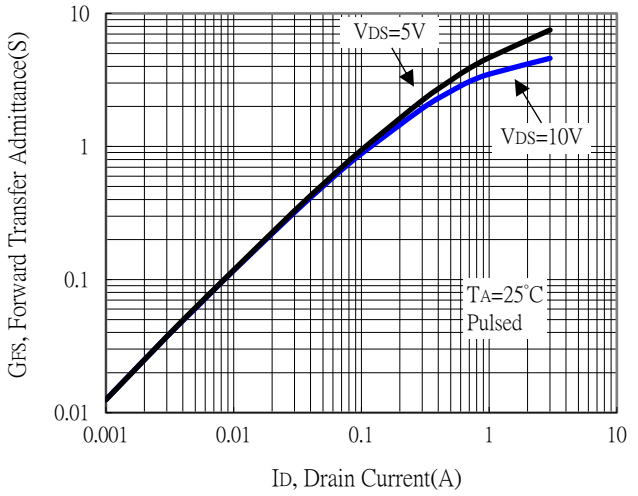
Capacitance vs Drain-to-Source Voltage



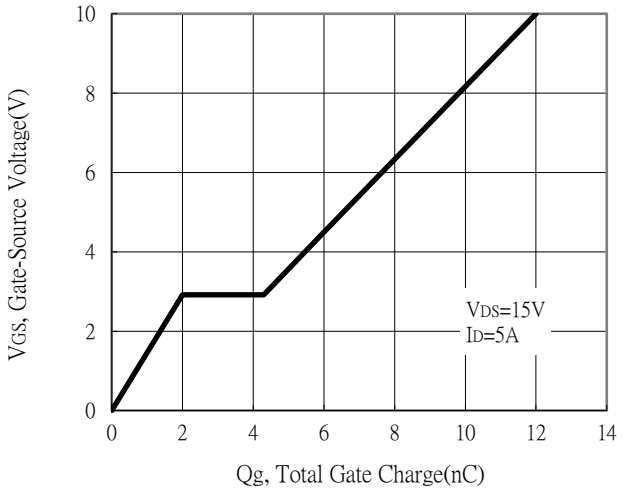
Threshold Voltage vs Junction Temperature



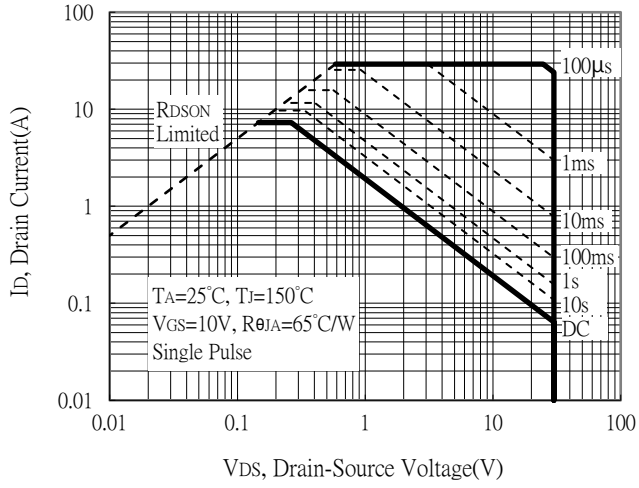
Forward Transfer Admittance vs Drain Current



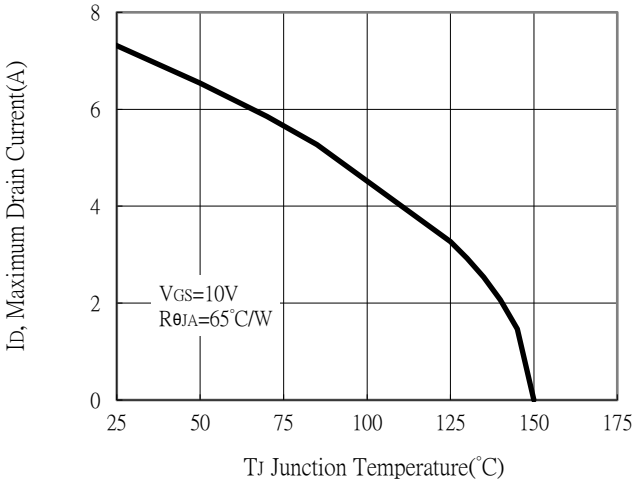
Gate Charge Characteristics



Maximum Safe Operating Area

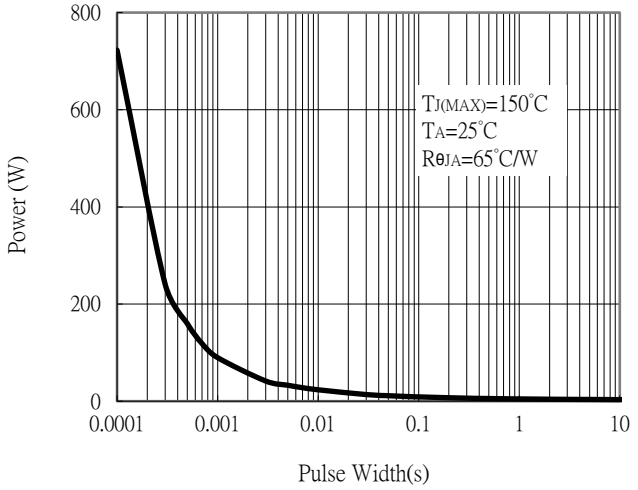


Maximum Drain Current vs Junction Temperature

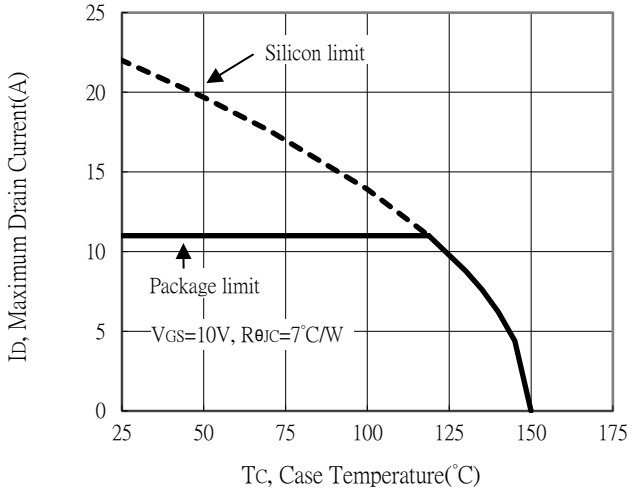


N-Channel Typical Characteristics

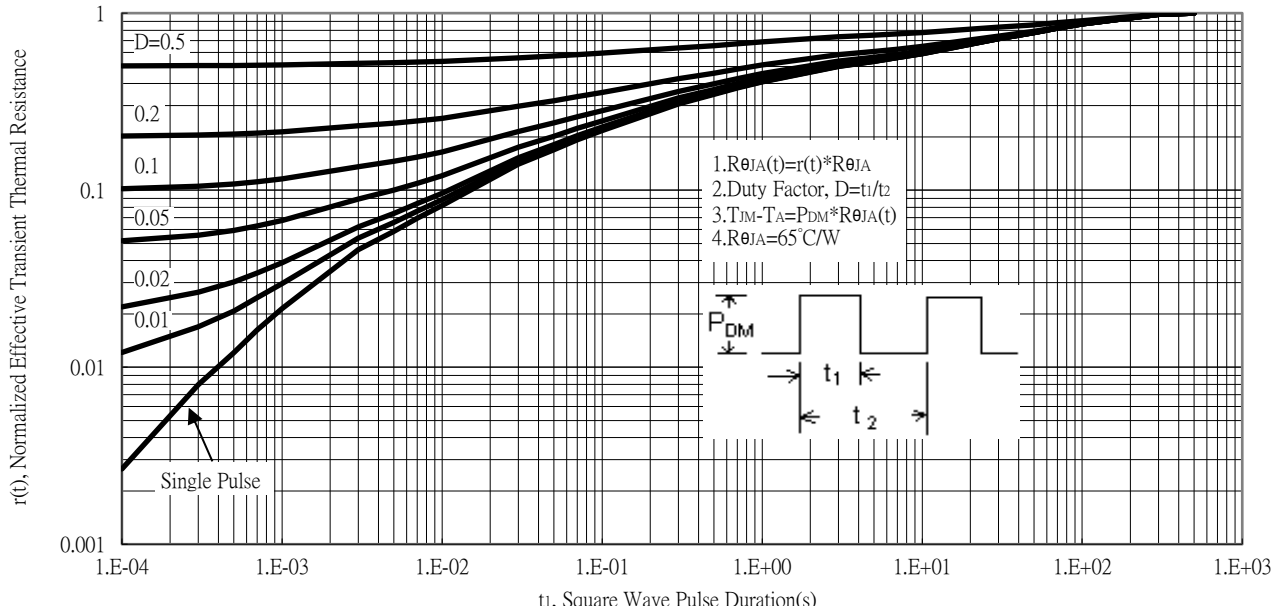
Single Pulse Power Rating, Junction to Ambient



Maximum Drain Current vs Case Temperature

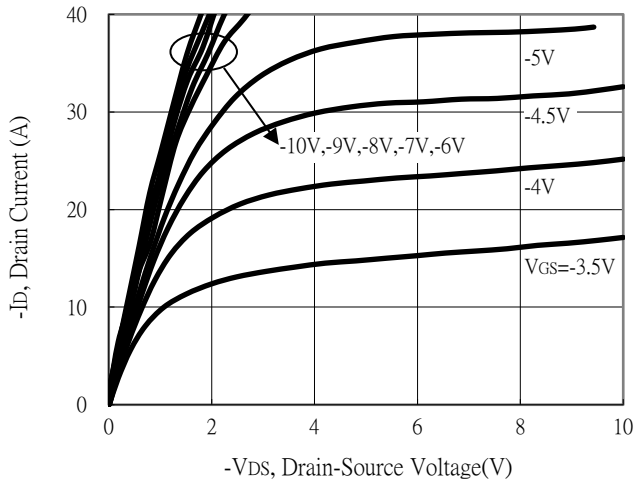


Transient Thermal Response Curves

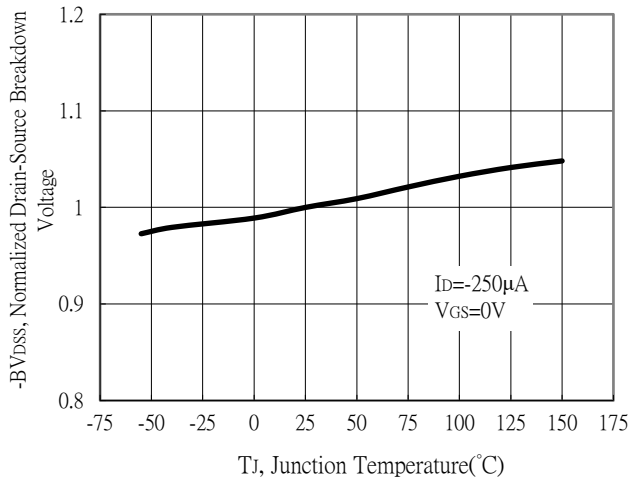


P-Channel Typical Characteristics

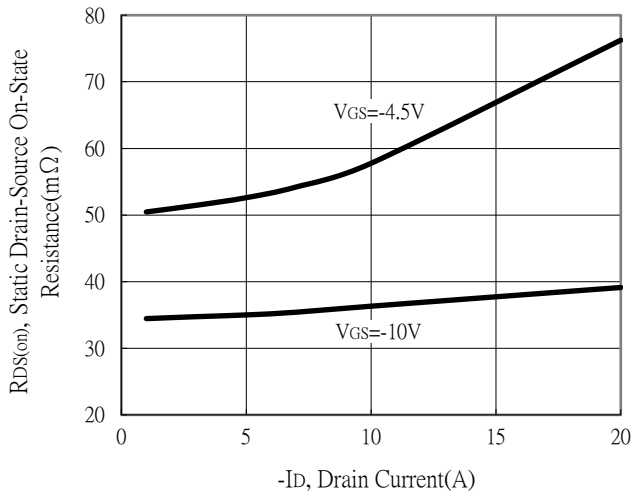
Typical Output Characteristics



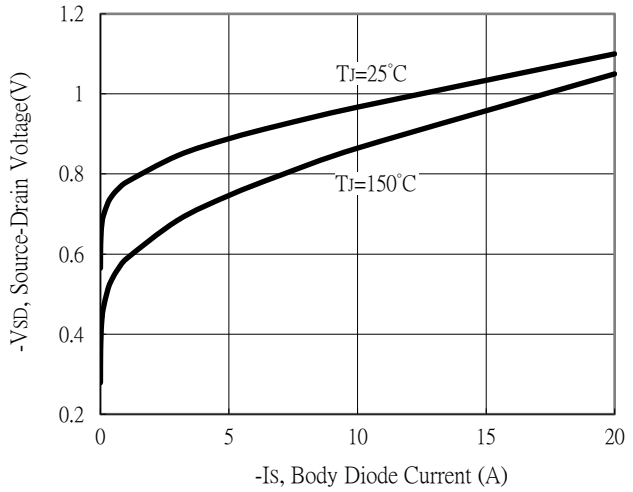
Breakdown Voltage vs Ambient Temperature



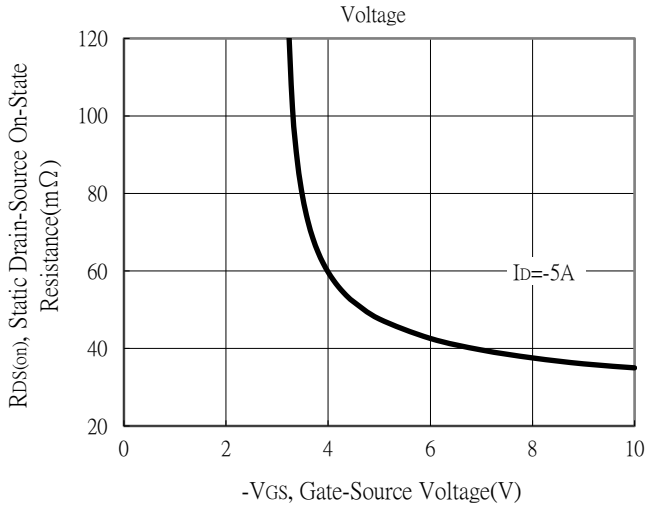
Static Drain-Source On-State resistance vs Drain Current



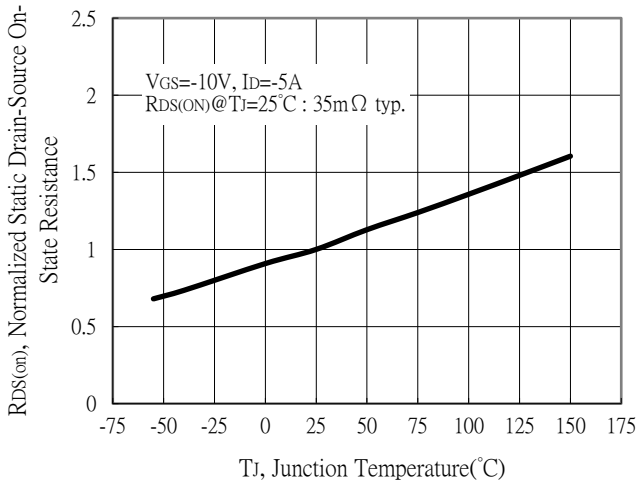
Body Diode Current vs Source-Drain Voltage



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

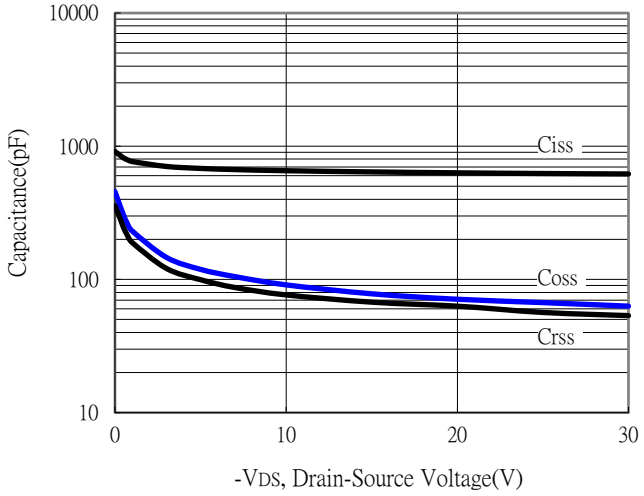


Drain-Source On-State Resistance vs Junction Temperature

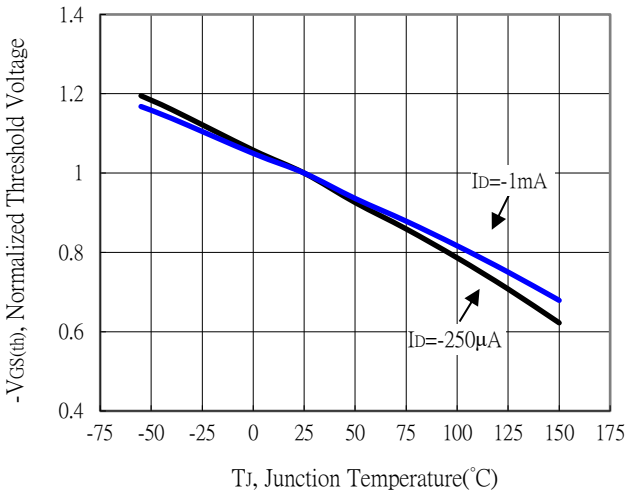


P-Channel Typical Characteristics

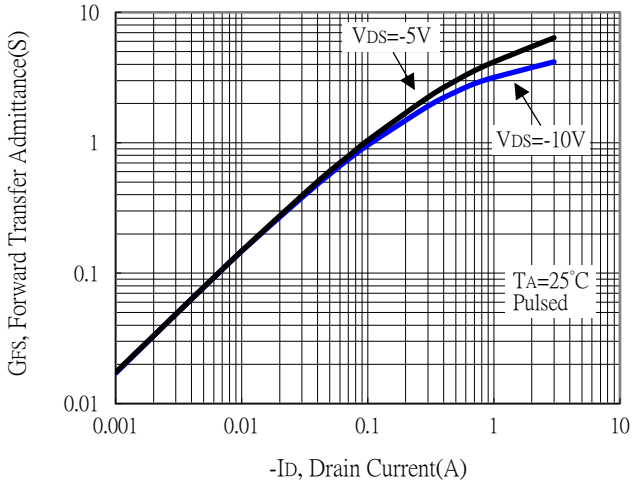
Capacitance vs Drain-to-Source Voltage



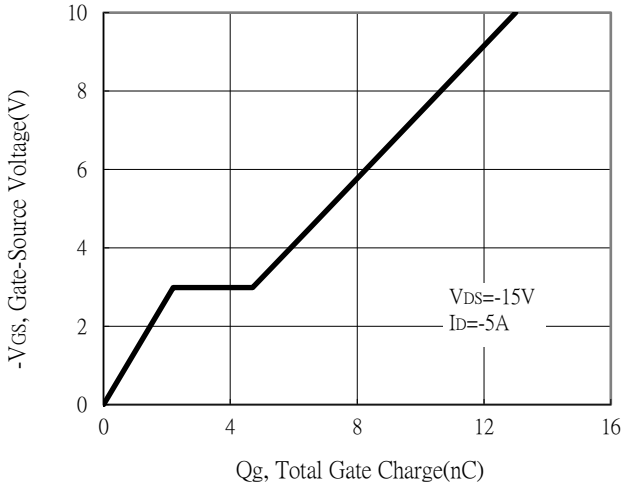
Threshold Voltage vs Junction Temperature



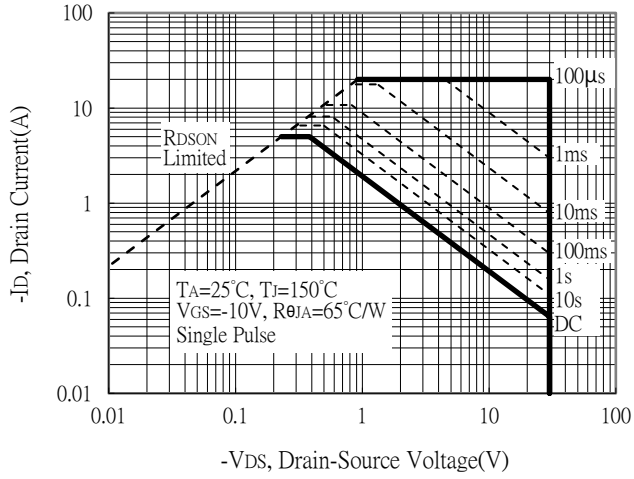
Forward Transfer Admittance vs Drain Current



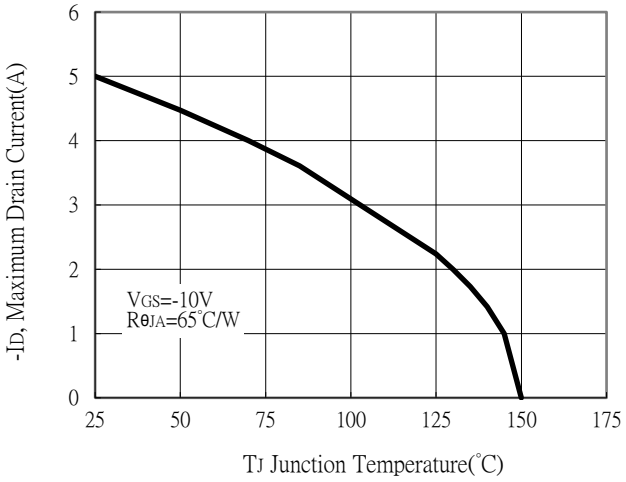
Gate Charge Characteristics



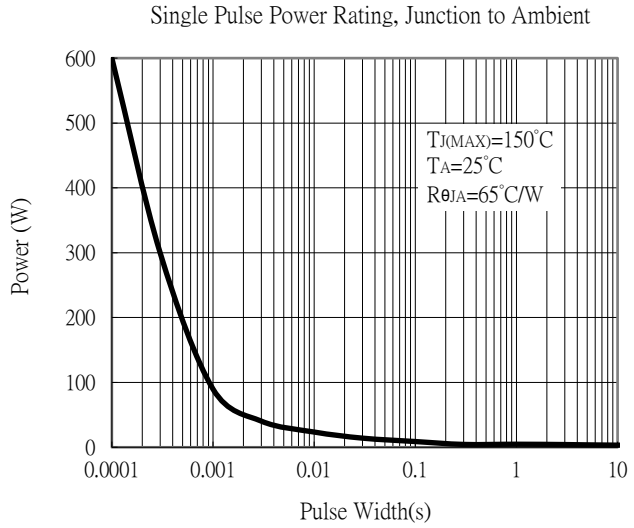
Maximum Safe Operating Area

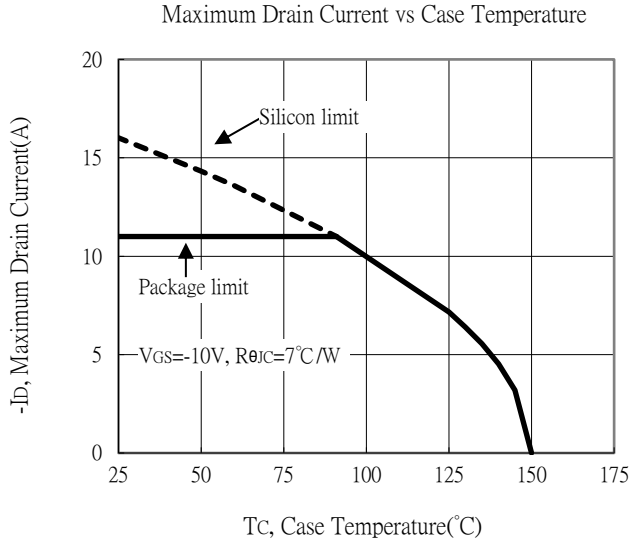


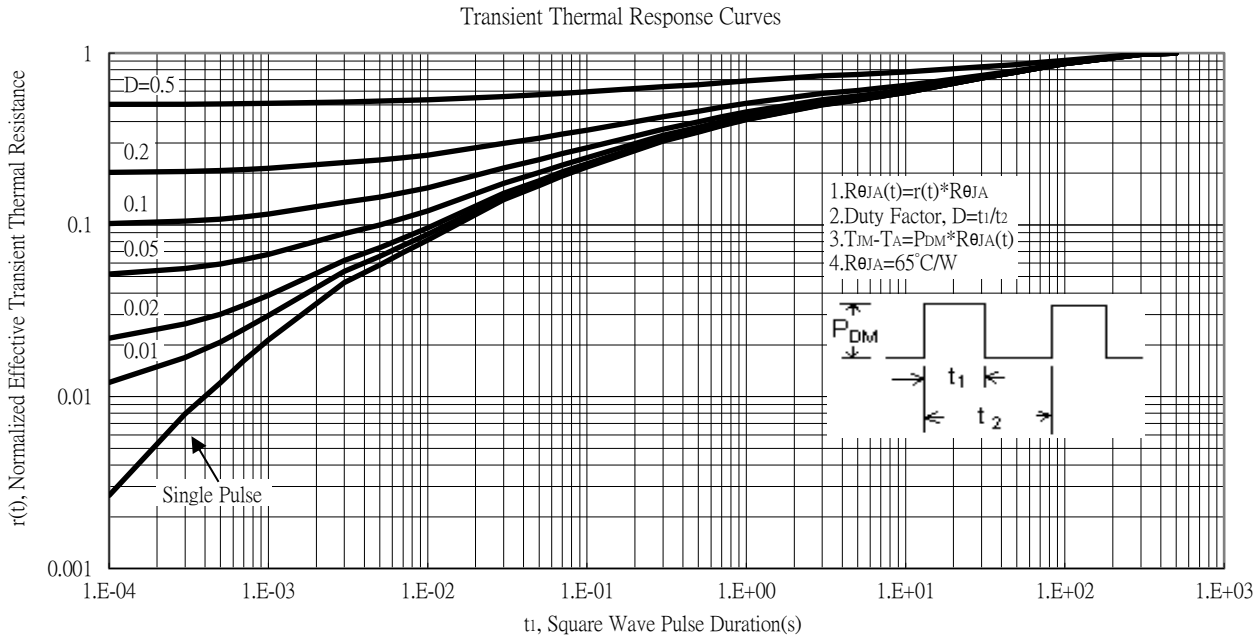
Maximum Drain Current vs Junction Temperature



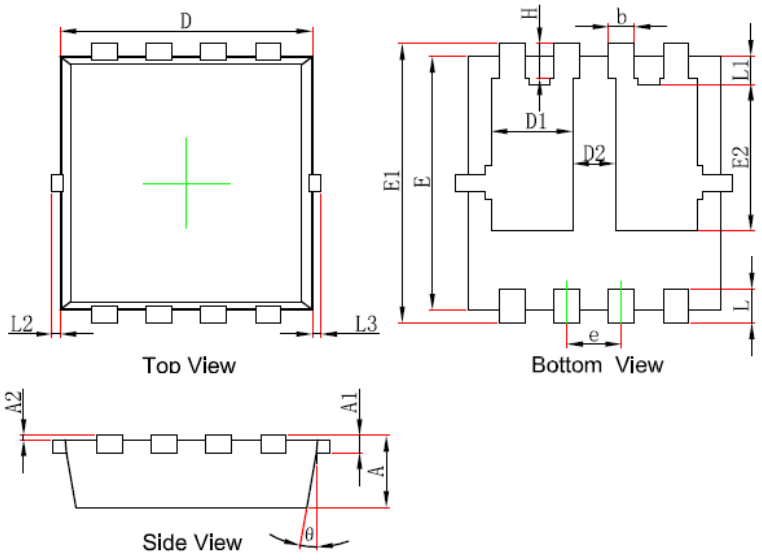
P-Channel Typical Characteristics



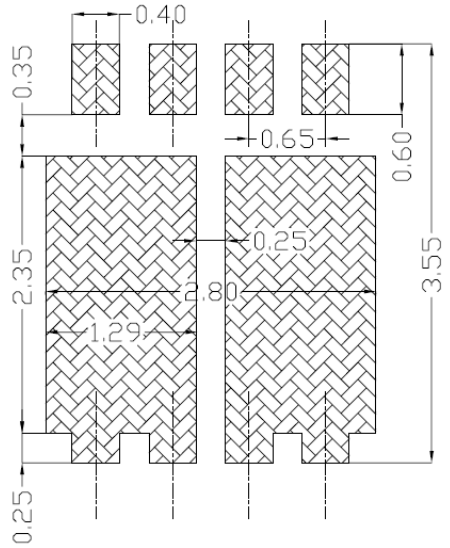




DFN3×3 Dimension



8-Lead DFN3×3 Plastic Package
CYS Package Code : V8



Unit : mm

Recommended Soldering Footprint

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min.	Max.	Min.	Min.		Min.	Max.	Min.	Max.
A	0.650	0.850	0.026	0.033	b	0.200	0.400	0.008	0.016
A1	0.152	REF	0.006	REF	e	0.550	0.750	0.022	0.030
A2	0.000	0.050	0.000	0.002	L	0.300	0.500	0.012	0.020
D	2.900	3.100	0.114	0.122	L1	0.180	0.480	0.007	0.019
D1	0.935	1.135	0.037	0.045	L2	0.000	0.100	0.000	0.004
D2	0.280	0.480	0.011	0.019	L3	0.000	0.100	0.000	0.004
E	2.900	3.100	0.114	0.122	H	0.315	0.515	0.012	0.020
E1	3.150	3.450	0.124	0.136	θ	9°	13°	9°	13°
E2	1.535	1.935	0.060	0.076					

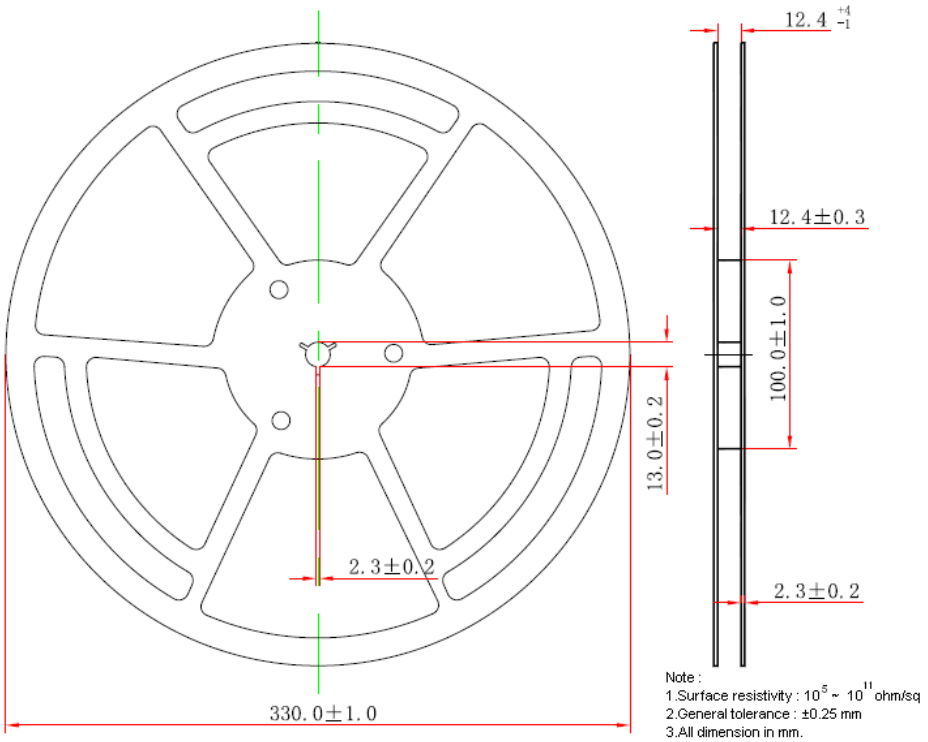
Note:

- Controlling dimension: millimeters.
- Maximum lead thickness includes lead finish thickness, and minimum lead thickness is the minimum thickness of base material.
- If there is any question with packing specification or packing method, please contact your local CYStek sales office.

Material:

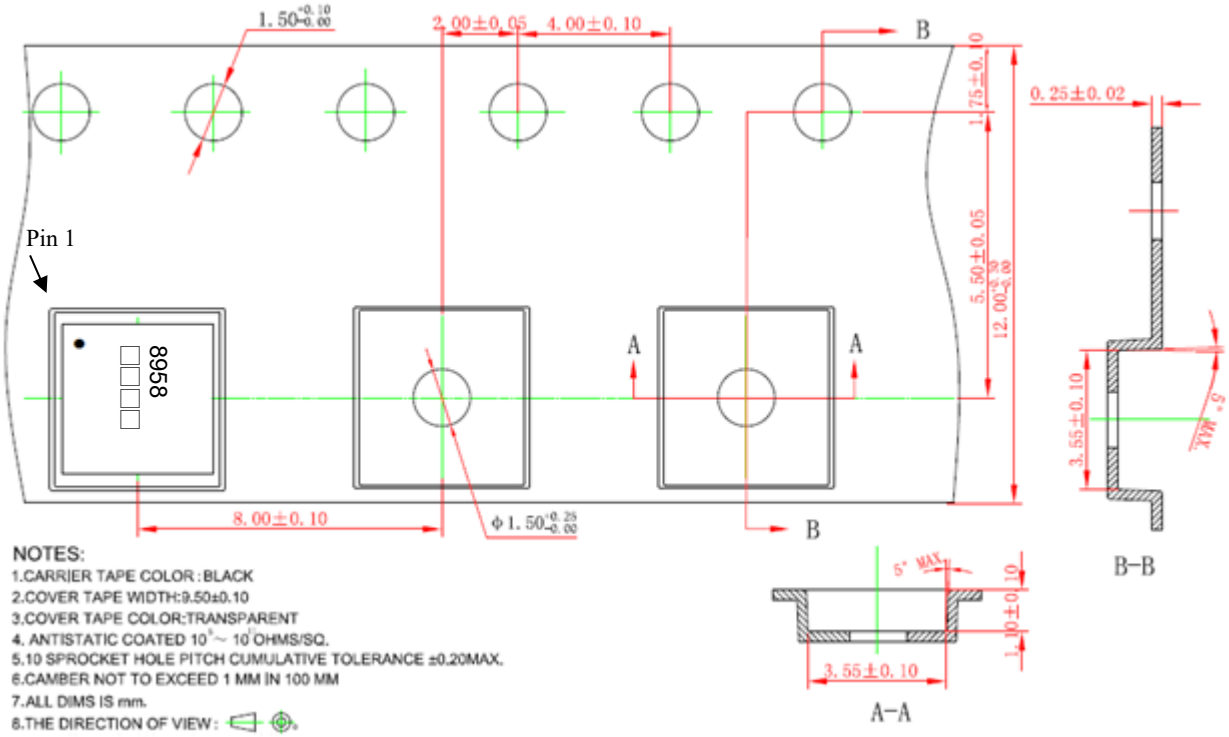
- Lead: pure tin plated.
- Mold Compound: Epoxy resin family, flammability solid burning class: UL94V-0.

Reel Dimension



Note :
1.Surface resistivity : 10^{5} ~ 10^{11} ohm/sq
2.General tolerance : ±0.25 mm
3.All dimension in mm.

Carrier Tape Dimension

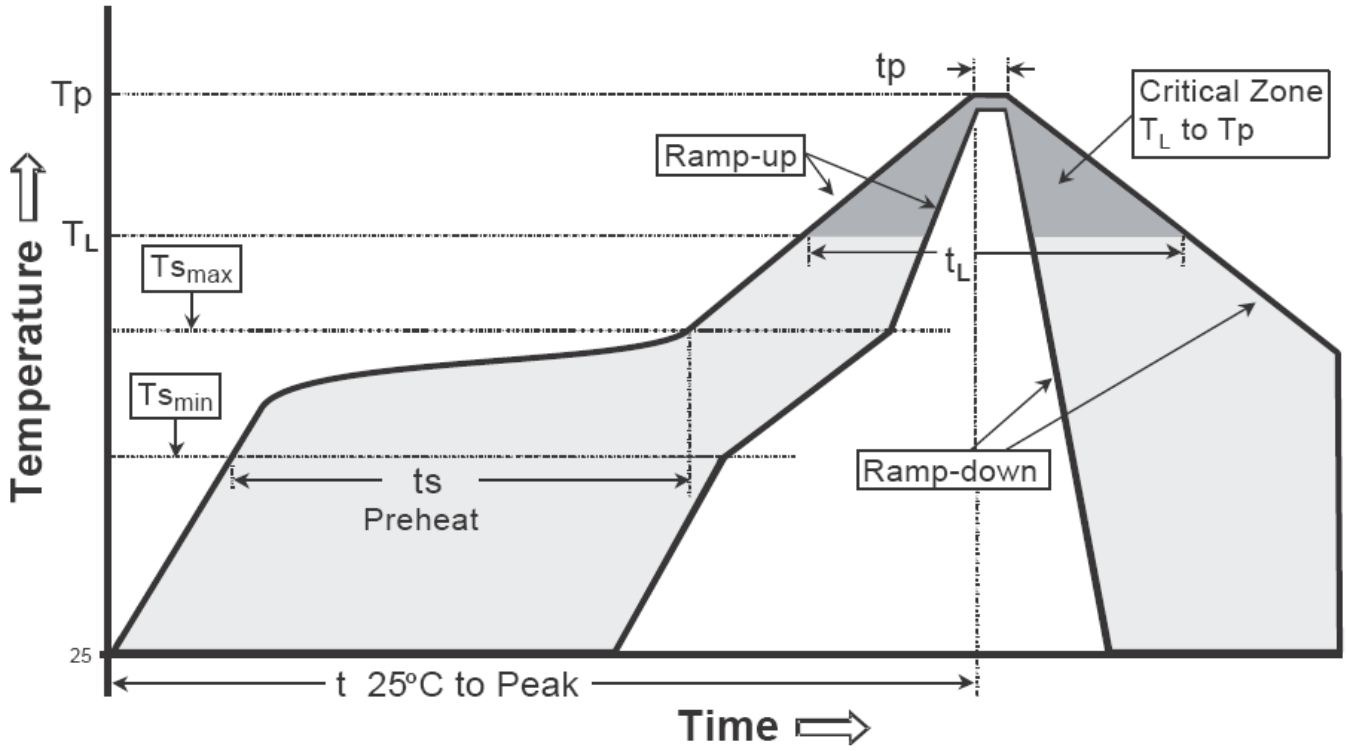


NOTES:
1.CARRIER TAPE COLOR : BLACK
2.COVER TAPE WIDTH:9.50±0.10
3.COVER TAPE COLOR:TRANSPARENT
4. ANTISTATIC COATED 10^{5}~ 10^{11} OHMS/SQ.
5.10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.20MAX.
6.CAMBER NOT TO EXCEED 1 MM IN 100 MM
7.ALL DIMS IS mm.
8.THE DIRECTION OF VIEW :

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 (T_S max to T_P)	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 (t_P)	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.