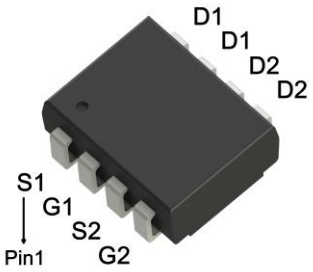
Product Summary

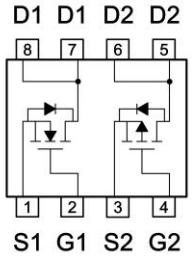
	N-CH	P-CH	
BV_{DSS}	30	-30	V
$R_{DS(ON)}$ typ. @ V_{GS}=(-)10V	14	40	mΩ
$R_{DS(ON)}$ typ. @ V_{GS}=(-)4.5V	22	68	
I_D @ V_{GS}=(-)10V, T_C=25°C	9.9	-6.2	A
I_D @ V_{GS}=(-)10V, T_A=25°C	5.9	-3.6	

Features

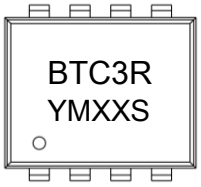
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and halogen-free

2928-8J





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
S: Assembly site code, Site 1: G

Ordering Information

Device	Package	Shipping
MTB018C03RN8J-0-T1-G	2928-8J	3000pcs / Tape & Reel

0: Product rank, zero for no rank products.
T1: Packing spec, T1 : 3000pcs / tape & reel, 7" 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		Unit
			N-CH	P-CH	
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	*a	I_D	9.9	-6.2	A
Continuous Drain Current @ V_{GS}=(-)10V, T_C=100°C	*a		6.3	-3.9	
Continuous Drain Current @ V_{GS}=(-)10V, T_A=25°C	*b		5.9	-3.6	
Continuous Drain Current @ V_{GS}=(-)10V, T_A=70°C	*b		4.7	-2.9	
Pulsed Drain Current	*c	I_{DM}	39	-25	
Continuous Body Diode Forward Current @ T_C=25°C		I_S	2.7	-3	
Pulsed Body Diode Forward Current @ T_C=25°C		I_{SM}	10	-12	
Avalanche Current @ L=0.1mH		I_{AS}	5	-10	
Avalanche Energy @ L=0.5mH		E_{AS}	4	9	mJ
Total Power Dissipation	T_C=25°C *a	P_D	3.3	3.6	W
	T_C=100°C *a		1.3	1.4	
	T_A=25°C *b		1.2	1.2	
	T_A=70°C *b		0.8	0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150		°C
Steady State Thermal Resistance, Junction-to-Ambient		$R_{\theta JC}$	38	35	°C/W
Steady State Thermal Resistance, Junction-to-Ambient	*b	$R_{\theta JA}$	108	101	

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}	-	4.2	-	S	V_{DS}=10V, I_D=4.5A
I_{GSS}	-	-	±100	nA	V_{GS}=±20V, V_{DS}=0V
I_{DSS}	-	-	1	μA	V_{DS}=24V, V_{GS}=0V
$R_{DS(ON)}$	-	14	19	mΩ	V_{GS}=10V, I_D=4.5A
	-	22	31		V_{GS}=4.5V, I_D=2A
Dynamic					
C_{iss}	-	270	-	pF	V_{DS}=15V, V_{GS}=0V, f=1MHz
C_{oss}	-	200	-		
C_{rss}	-	34	-		
Rg	-	0.4	-	Ω	f=1MHz
Q_g *d,e	-	3	-	nC	V_{DS}=15V, I_D=4.5A, V_{GS}=4.5V
Q_g *d,e	-	6	-		V_{DS}=15V, I_D=4.5A, V_{GS}=10V
Q_{gs} *d,e	-	1.2	-		
Q_{gd} *d,e	-	1.2	-		
$t_{d(ON)}$ *d,e	-	4.6	-	ns	V_{DS}=15V, I_D=3A, V_{GS}=10V, R_{GS}=10Ω
tr *d,e	-	16	-		
$t_{d(OFF)}$ *d,e	-	13.5	-		
t_f *d,e	-	4.3	-		
Source-Drain Diode					
V_{SD} *d	-	0.83	1.2	V	I_S=4.5A, V_{GS}=0V
t_{rr}	-	11	-	ns	I_F=4A, 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}	-	5.1	-	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
$R_{DS(ON)}$	-	40	54	mΩ	V_{GS}=-10V, I_D=-3A
	-	68	98		V_{GS}=-4.5V, I_D=-1.5A
Dynamic					
C_{iss}	-	470	-	pF	V_{DS}=-15V, V_{GS}=0V, f=1MHz
C_{oss}	-	65	-		
C_{rss}	-	60	-		
Rg	-	10	-	Ω	f=1MHz
Q_g *d,e	-	5.3	-	nC	V_{DS}=-15V, I_D=-3A, V_{GS}=-4.5V
Q_g *d,e	-	11	-		V_{DS}=-15V, I_D=-3A, V_{GS}=-10V
Q_{gs} *d,e	-	1.6	-		
Q_{gd} *d,e	-	2.2	-		
$t_{d(ON)}$ *d,e	-	6	-	ns	V_{DS}=-15V, I_D=-3A, V_{GS}=-10V, R_{GS}=1Ω
tr *d,e	-	16	-		
$t_{d(OFF)}$ *d,e	-	30	-		
t_f *d,e	-	7	-		
Source-Drain Diode					
V_{SD} *d	-	-0.88	-1.2	V	I_S=-3A, V_{GS}=0V
t_{rr}	-	8.5	-	ns	I_F=-3A, di/dt=100A/μs
Q_{rr}	-	4	-	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

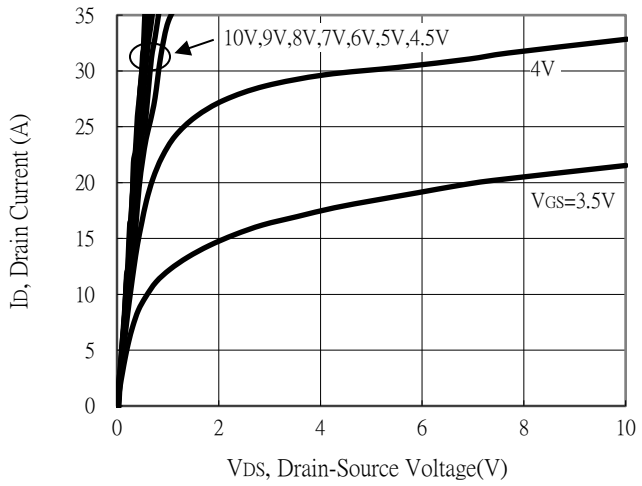
*c. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to

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

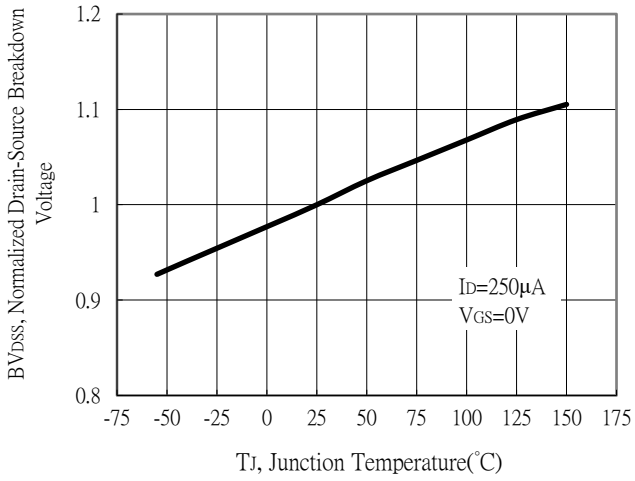
*e. Independent of operating temperature.

N-Channel Typical Characteristics

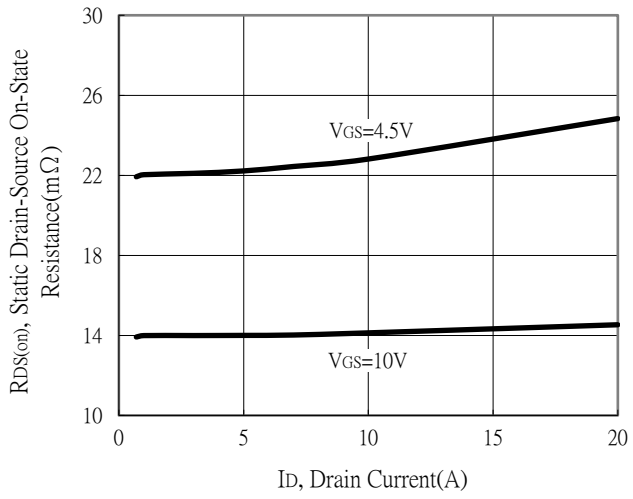
Typical Output Characteristics



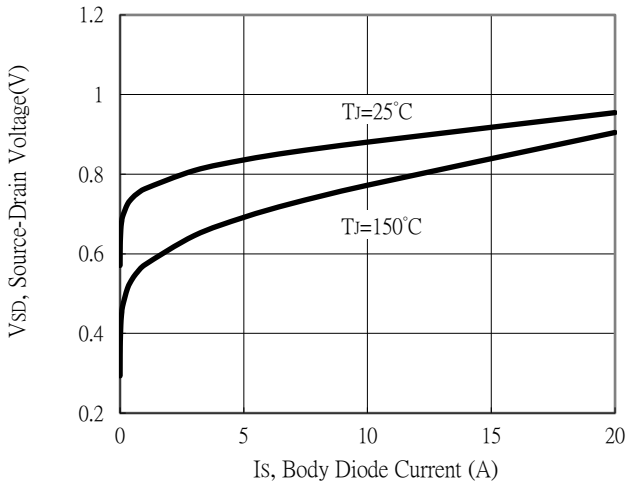
Breakdown Voltage vs Ambient Temperature



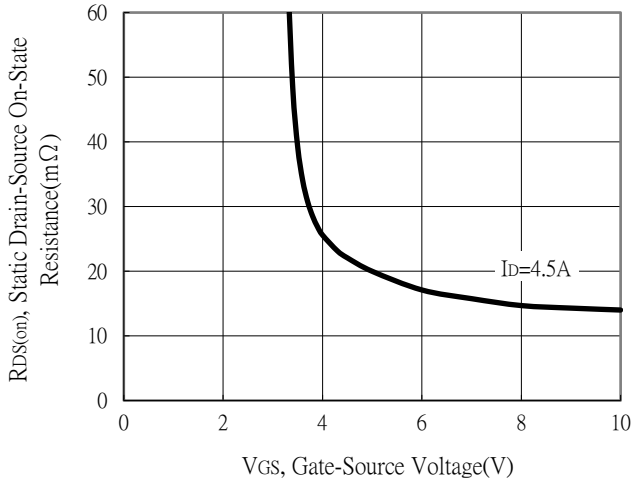
Static Drain-Source On-State resistance vs Drain Current



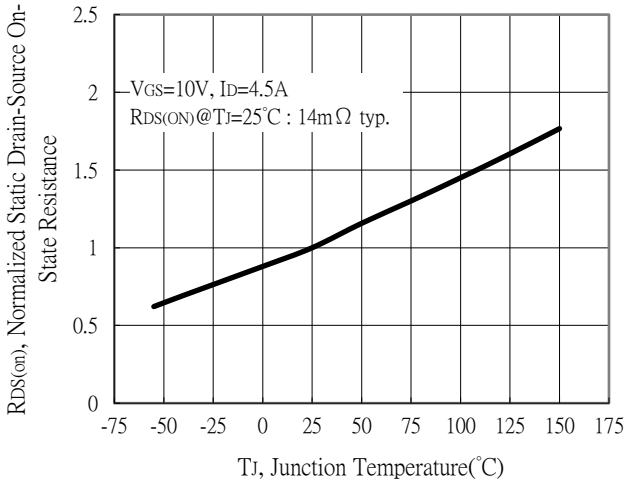
Body Diode Current vs Source-Drain Voltage



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

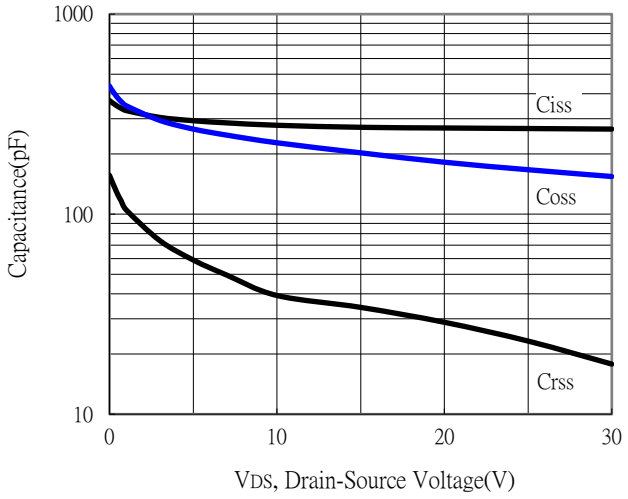


Drain-Source On-State Resistance vs Junction Temperature

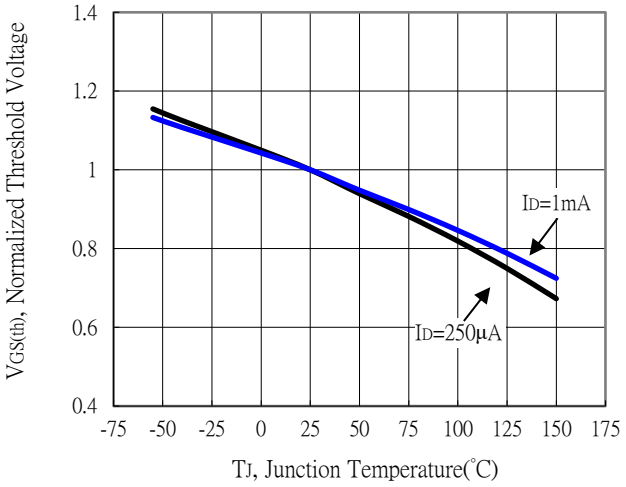


N-Channel Typical Characteristics

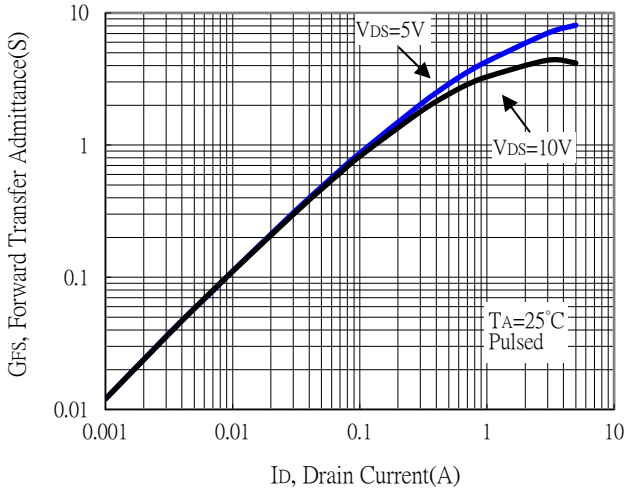
Capacitance vs Drain-to-Source Voltage



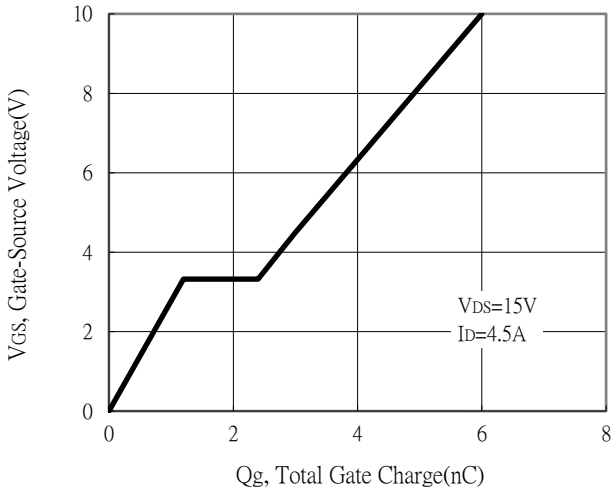
Threshold Voltage vs Junction Temperature



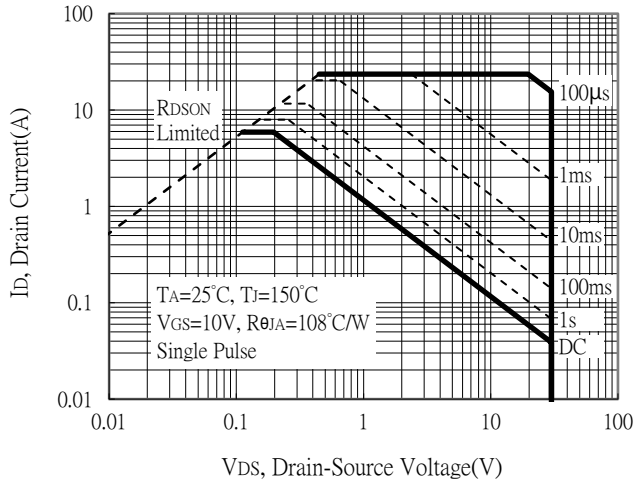
Forward Transfer Admittance vs Drain Current



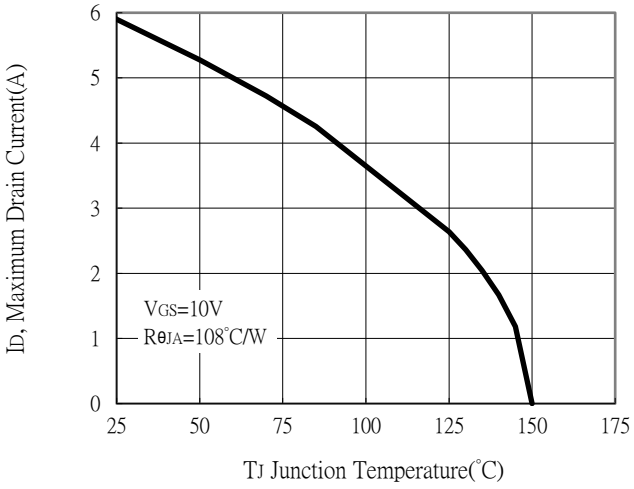
Gate Charge Characteristics



Maximum Safe Operating Area

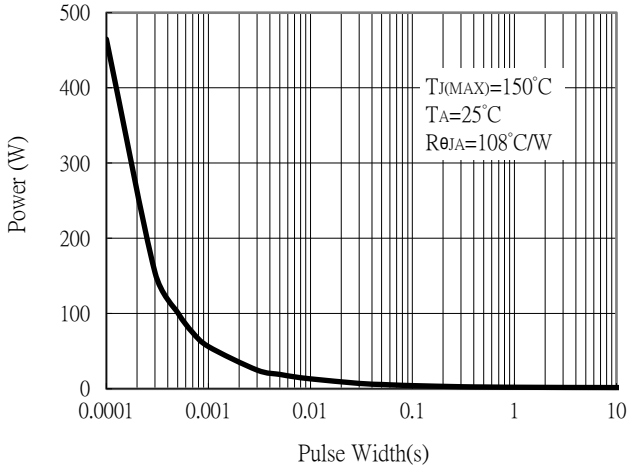


Maximum Drain Current vs Junction Temperature

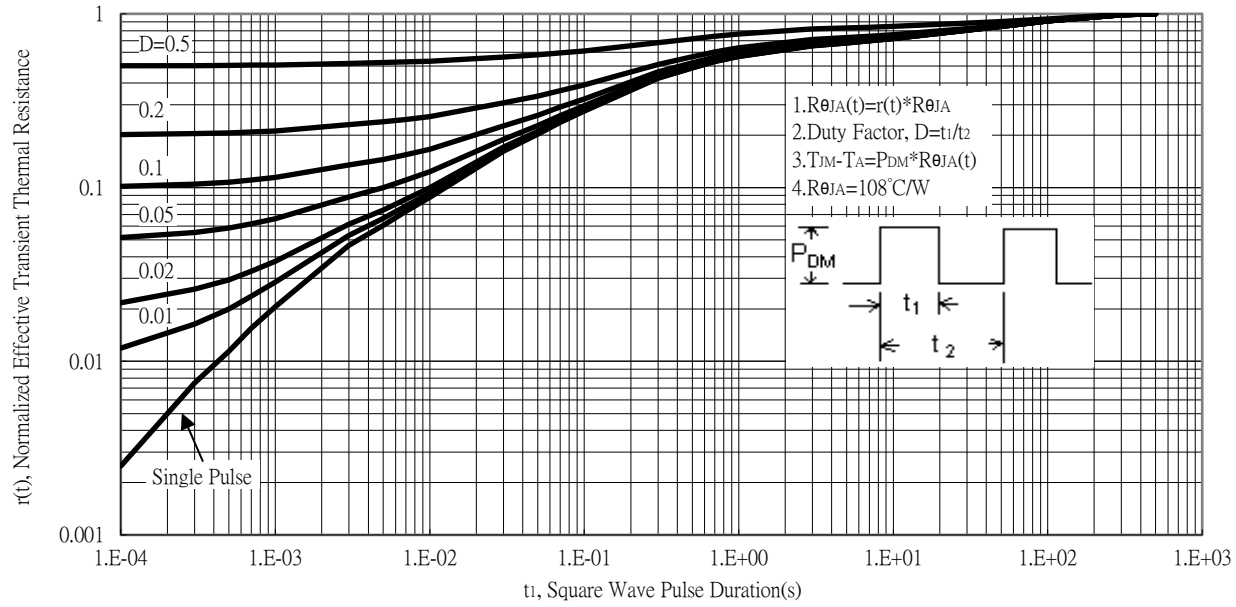


N-Channel Typical Characteristics

Single Pulse Power Rating, Junction to Ambient

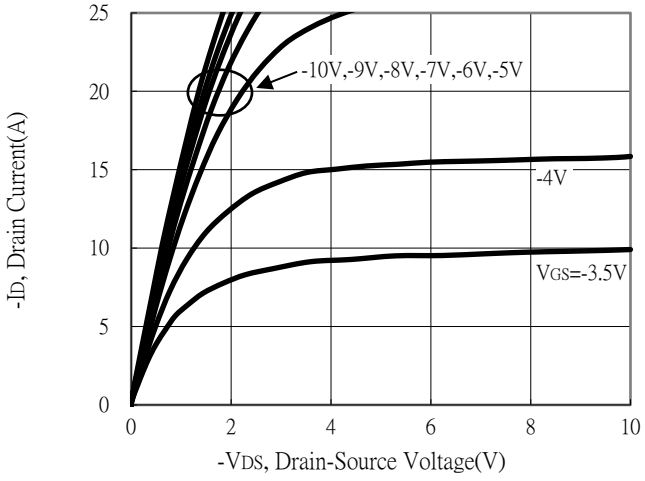


Transient Thermal Response Curves

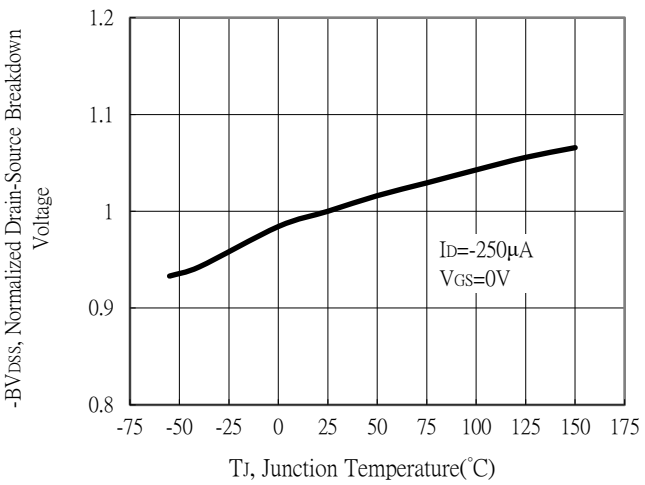


P-Channel Typical Characteristics

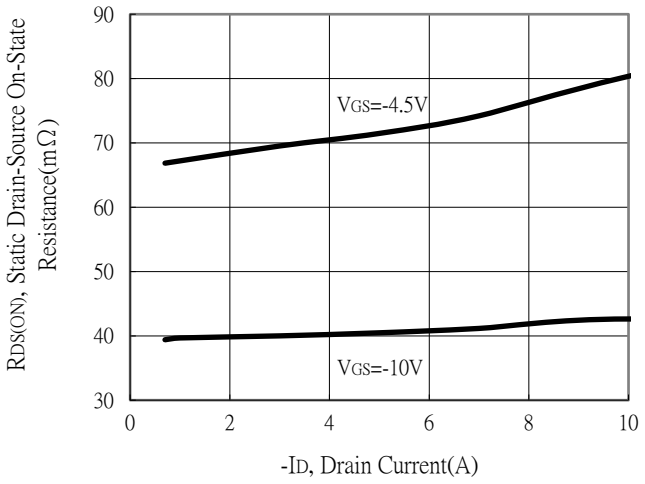
Typical Output Characteristics



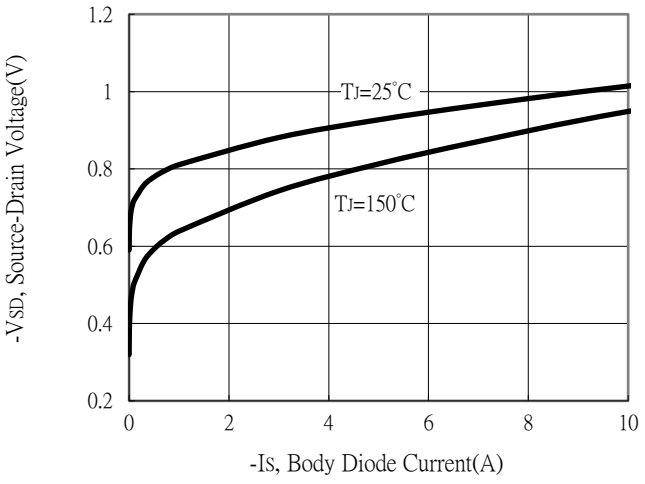
Breakdown Voltage vs Ambient Temperature



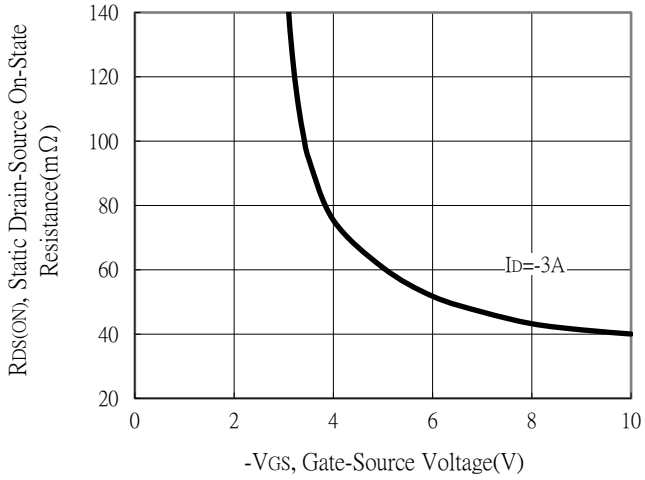
Static Drain-Source On-State resistance vs Drain Current



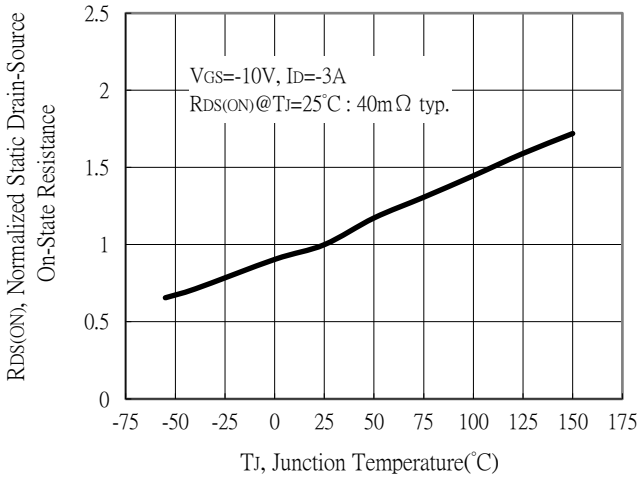
Body Diode Current vs Source-Drain Voltage



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

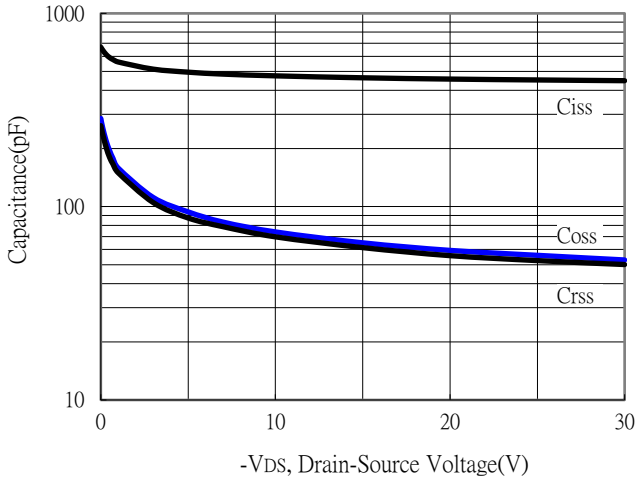


Drain-Source On-State Resistance vs Junction Temperature

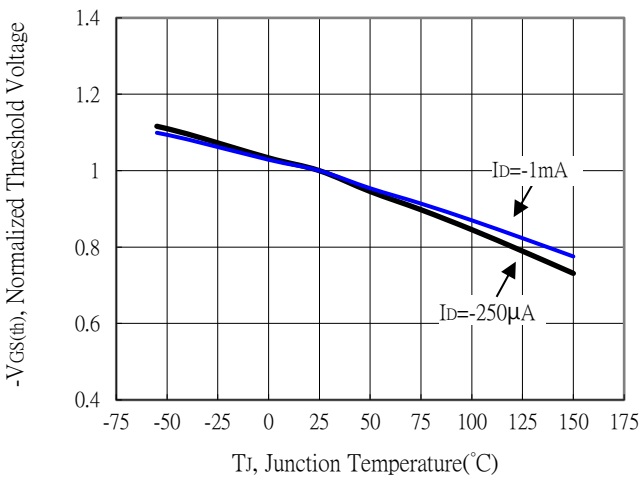


P-Channel Typical Characteristics

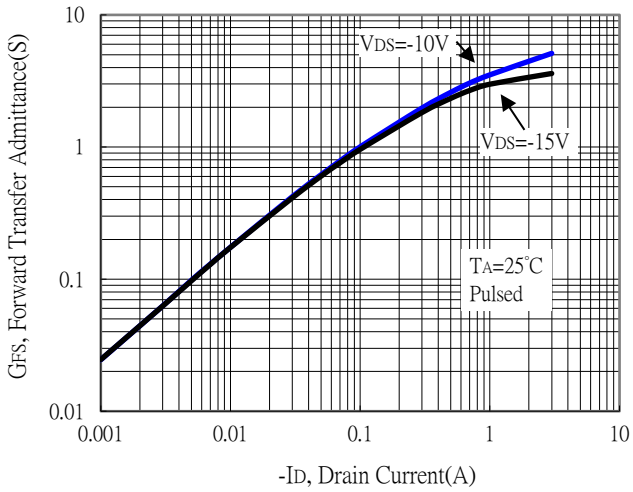
Capacitance vs Drain-to-Source Voltage



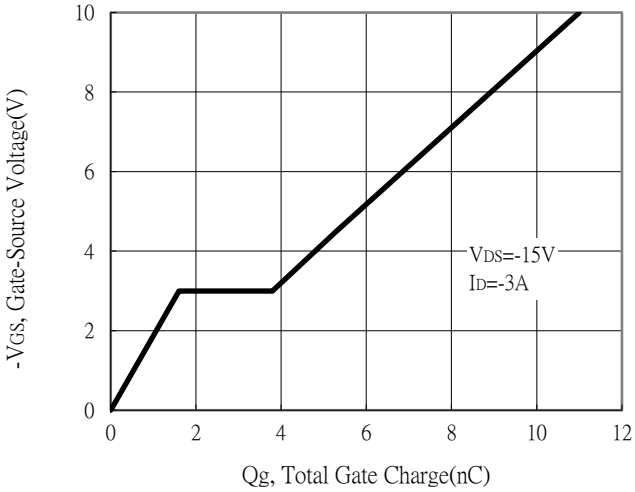
Threshold Voltage vs Junction Temperature



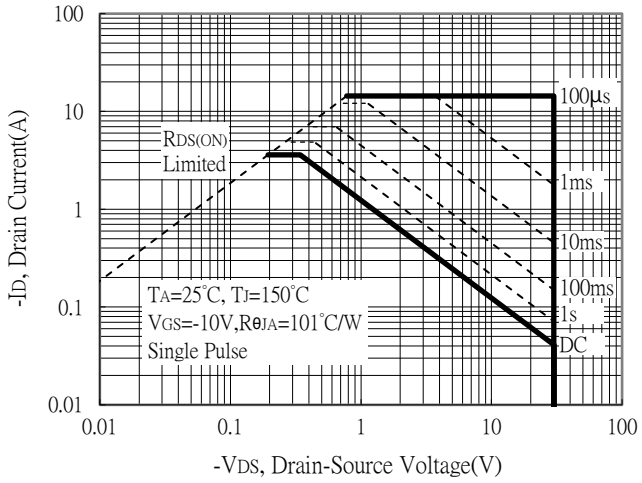
Forward Transfer Admittance vs Drain Current



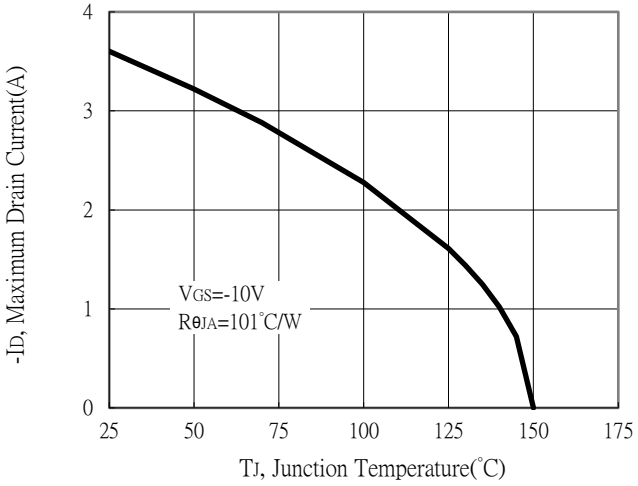
Gate Charge Characteristics



Maximum Safe Operating Area

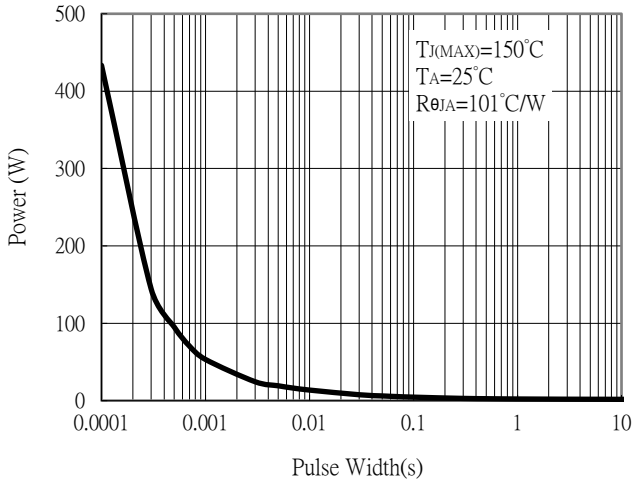


Maximum Drain Current vs Junction Temperature

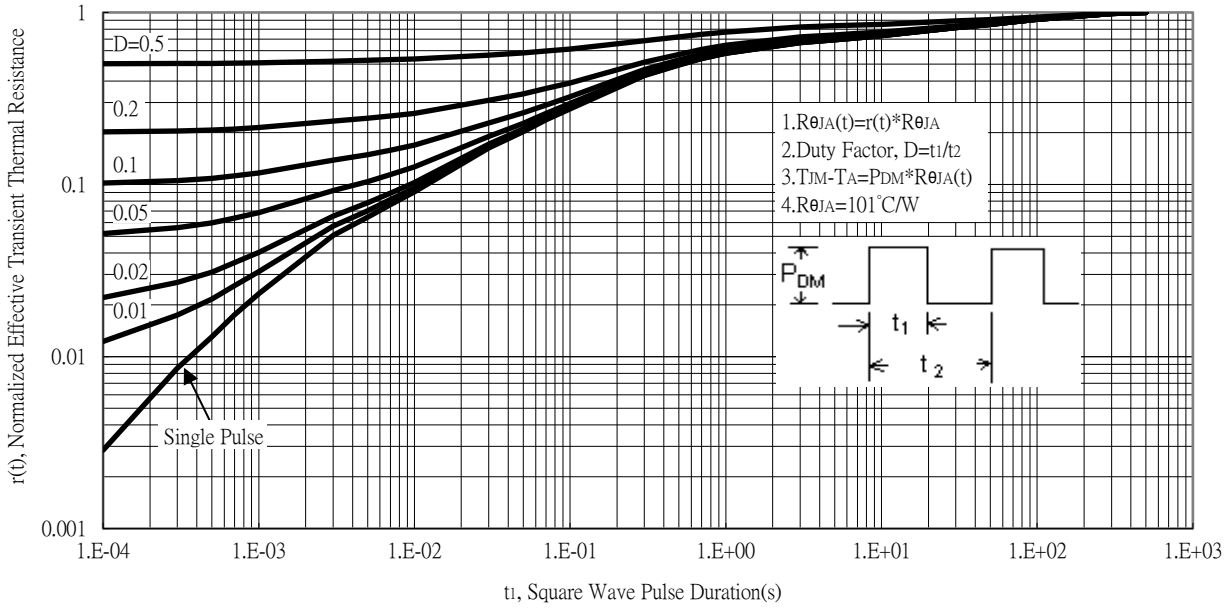


P-Channel Typical Characteristics

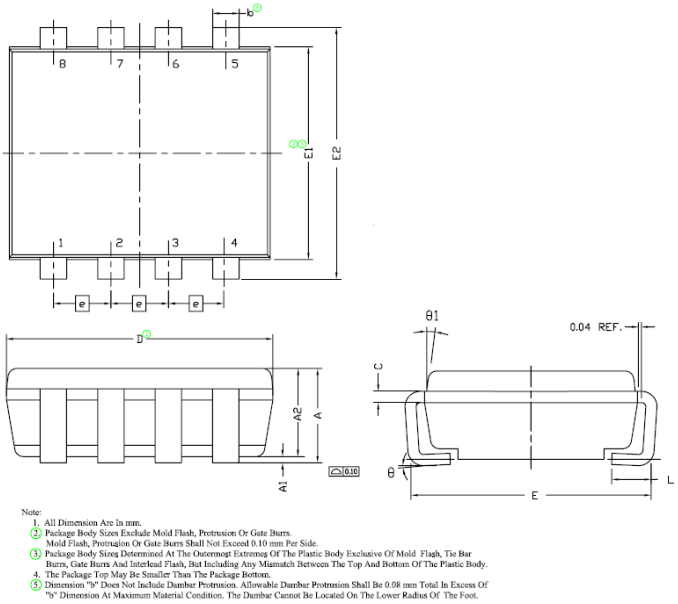
Single Pulse Power Rating, Junction to Ambient



Transient Thermal Response Curves

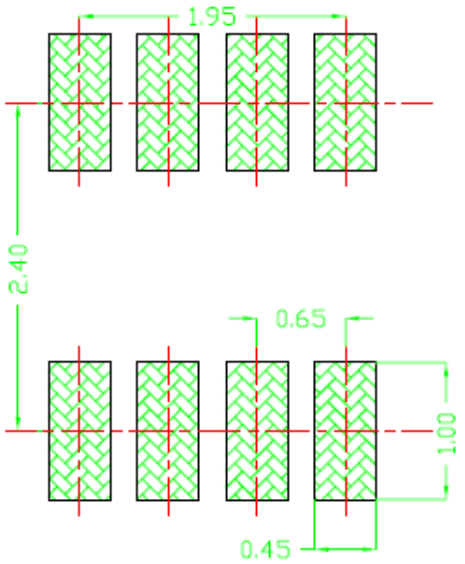


2928-8J Dimension



Note:
1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gute Burrs. Mold Flash, Protrusion Or Gute 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 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.
5. Dimension "b" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.08 mm Total In Excess Of "b" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.

8-Lead 2928-8J Plastic Package
CYS Package Code: N8J



Recommended Soldering Footprint

DIM	Inches		Millimeters		DIM	Inches		Millimeters	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.0368	0.0433	0.935	1.100	E1	0.0906	0.0984	2.300	2.500
A1	0.0004	0.0039	0.010	0.100	E2	0.1043	0.1201	2.650	3.050
A2	0.0364	0.0394	0.925	1.000	e	0.0256	BSC	0.650	BSC
b	0.0098	0.0157	0.250	0.400	L	0.0118	0.0236	0.300	0.600
c	0.0039	0.0079	0.100	0.200	θ	0°	8°	0°	8°
D	0.1161	0.1220	2.950	3.100	θ1	7°	TYP	7°	TYP
E	0.0984	0.1181	2.500	3.000					

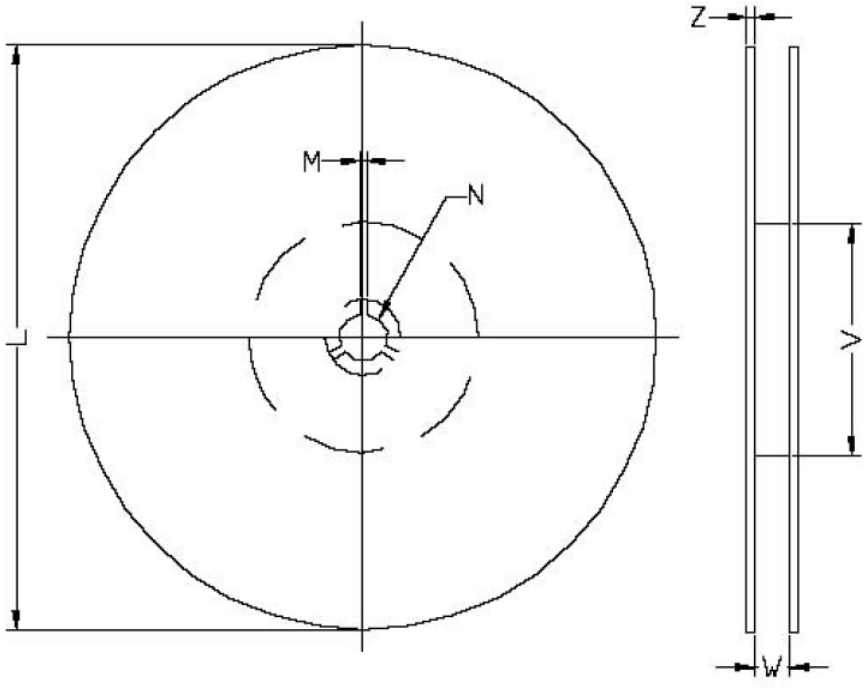
Note:

- 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.

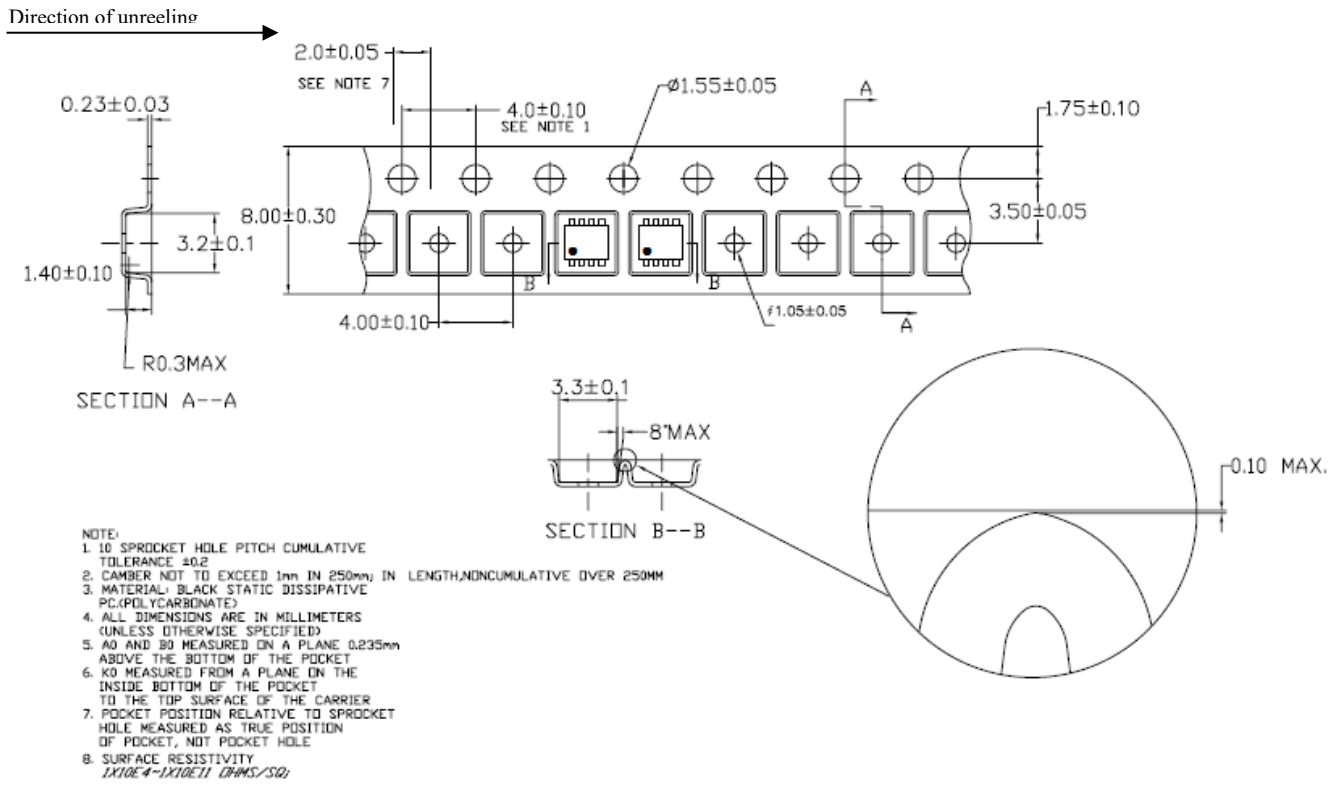
Reel Dimension



Unit: mm

MAIN DIM	Min	Max
L	177	179
M	1.5	2.5
N	12.8	14.0
V	***76***	***78***
W	8.4	9.9
Z	0.9	1.5

Carrier Tape Dimension

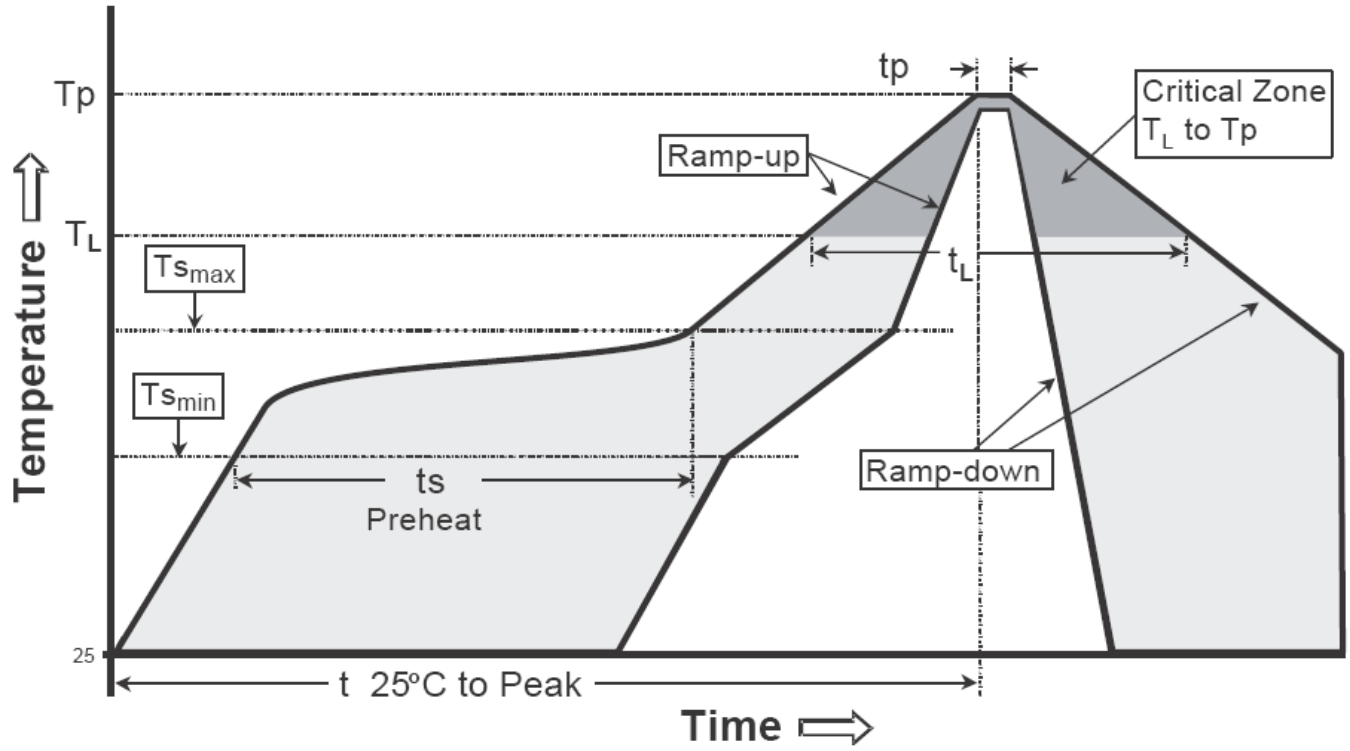


NOTE:
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2. CAMBER NOT TO EXCEED 1mm IN 250mm; IN LENGTH,NONCUMULATIVE OVER 250MM
3. MATERIAL: BLACK STATIC DISSIPATIVE PC(POLYCARBONATE)
4. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED)
5. A0 AND B0 MEASURED ON A PLANE 0.235mm ABOVE THE 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)

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.