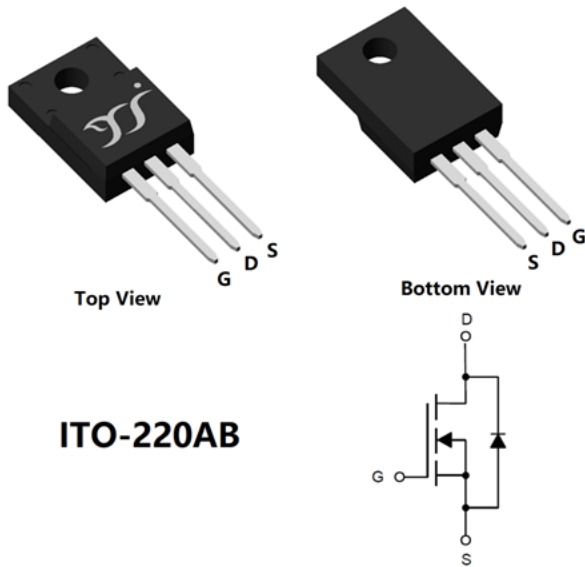


N-Channel Enhancement Mode Field Effect Transistor



Product Summary

- V_{DS} 650V
- I_D 18A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) < 580 m Ω
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

Applications

- Switch mode power supply
- Uninterruptible power supply
- TV power
- Adapter/Charger

Limiting Values

Parameter	Conditions		Symbol	Min	Max	Unit
Drain-source Voltage			V _{DS}	-	650	V
Gate-source Voltage			V _{GS}	-30	30	
Continuous Drain Current (Note 1,2)	Steady-State	T _A =25°C,V _{GS} =10V	I _D	-	1.08	A
		T _A =100°C,V _{GS} =10V		-	0.68	
Continuous Drain Current (Note 1,3)	Steady-State	T _C =25°C,V _{GS} =10V		-	18	
		T _C =100°C,V _{GS} =10V		-	11.3	
Pulsed Drain Current	T _C =25°C,t _p ≤10μs		I _{DM}	-	72	
Maximum Body-Diode Continuous Current	T _C =25°C		I _S		18	
Avalanche Energy (non-repetitive)	T _J =25°C,V _G =10V,R _G =25Ω,L=30mH,I _{AS} =7.5A		EAS	-	843.7	mJ
Total Power Dissipation (Note 1,2)	Steady-State	T _A =25°C	P _D	-	1.89	W
		T _A =100°C		-	0.75	
Total Power Dissipation (Note 1,3)	Steady-State	T _C =25°C		-	96.1	
		T _C =100°C		-	38.4	
Junction and Storage Temperature Range			T _J ,T _{STG}	-55	150	°C

Thermal Resistance

Parameter		Symbol	Typ	Max	Units
Thermal Resistance Junction-to-Ambient (Note 2)	Steady-State	$R_{\theta JA}$	-	66	$^{\circ}C/W$
Thermal Resistance Junction-to-Case	Steady-State	$R_{\theta JC}$	-	1.3	



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■ Electrical Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Static Parameter						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A, T_j=25^\circ C$	650	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=650V, V_{GS}=0V, T_j=25^\circ C$	-	-	1	μA
		$V_{DS}=650V, V_{GS}=0V, T_j=125^\circ C$	-	-	250	
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 30V, V_{DS}=0V, T_j=25^\circ C$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A, T_j=25^\circ C$	2.2	3	3.8	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=9A, T_j=25^\circ C$	-	465	580	m Ω
Diode Forward Voltage	V_{SD}	$I_S=18A, V_{GS}=0V, T_j=25^\circ C$	-	0.89	1.2	V
Gate Resistance	R_G	$f=1MHz, T_j=25^\circ C$	-	1.24	-	Ω
Dynamic Parameters						
Input Capacitance	C_{iss}	$V_{DS}=325V, V_{GS}=0V, f=1MHz, T_j=25^\circ C$	-	2533	-	pF
Output Capacitance	C_{oss}		-	54	-	
Reverse Transfer Capacitance	C_{rss}		-	3.9	-	
Total Gate Charge	Q_g	$V_{GS}=10V, V_{DS}=325V, I_D=9A, T_j=25^\circ C$	-	48.7	-	nC
Gate-Source Charge	Q_{gs}		-	11.6	-	
Gate-Drain Charge	Q_{gd}		-	16.2	-	
Output charge (Note 4)	Q_{oss}	$V_{DS}=325V, V_{GS}=0V, T_j=25^\circ C$	-	47	-	nC
Reverse Recovery Charge	Q_{rr}	$I_F=9A, di/dt=100A/\mu s, V_{GS}=0V, V_R=325V, T_j=25^\circ C$	-	3548	-	nC
Reverse Recovery Time	t_{rr}		-	452	-	ns
Turn-on Delay Time	$t_{D(on)}$	$V_{GS}=10V, V_{DS}=325V, I_D=9A, R_{GEN}=3\Omega, T_j=25^\circ C$	-	29	-	ns
Turn-on Rise Time	t_r		-	32	-	
Turn-off Delay Time	$t_{D(off)}$		-	34	-	
Turn-off Fall Time	t_f		-	17	-	

Note:

1. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
2. The value of $R_{\theta JA}$ is measured in the still air environment with $T_A=25^\circ C$. The maximum allowed junction temperature of $150^\circ C$.
3. Thermal resistance from junction to soldering point (on the exposed drain pad).
4. Defined by design. Not subject to production test.



■ Typical Electrical and Thermal Characteristics Diagrams

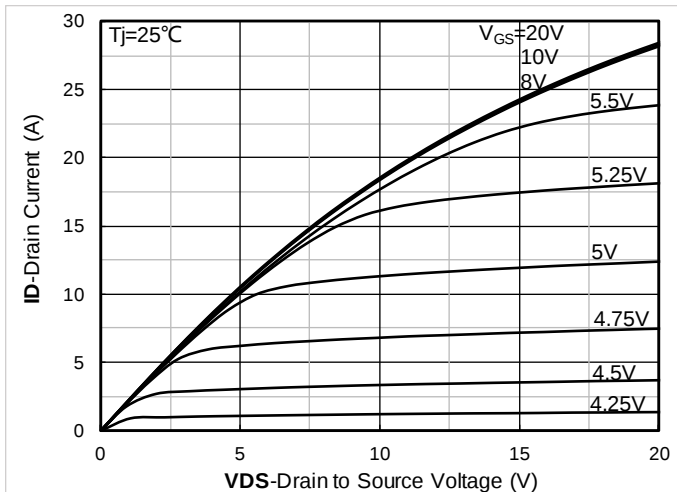


Figure 1. Output Characteristics; typical values

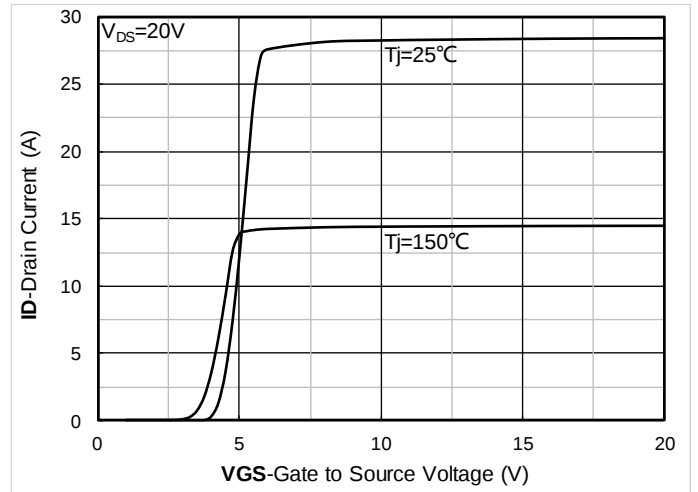


Figure 2. Transfer Characteristics; typical values

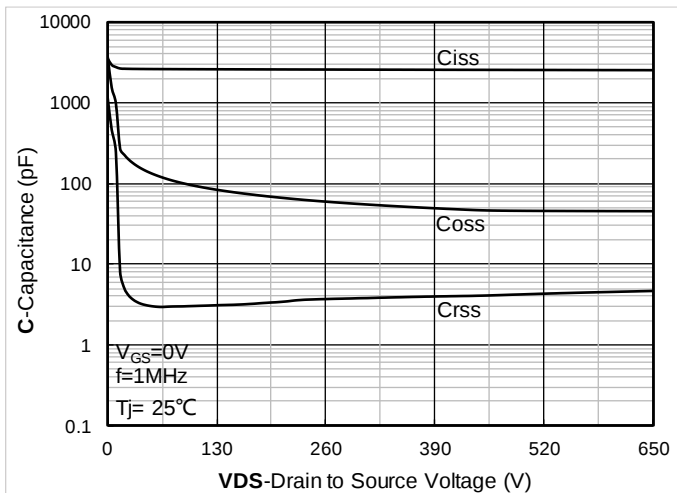


Figure 3. Capacitance Characteristics; typical values

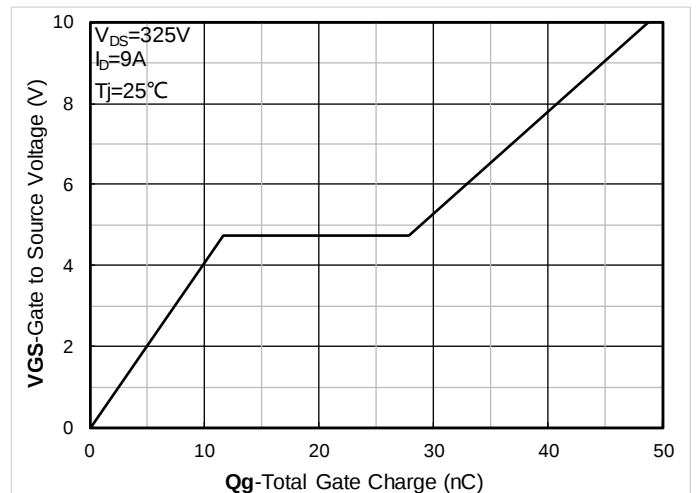


Figure 4. Gate Charge; typical values

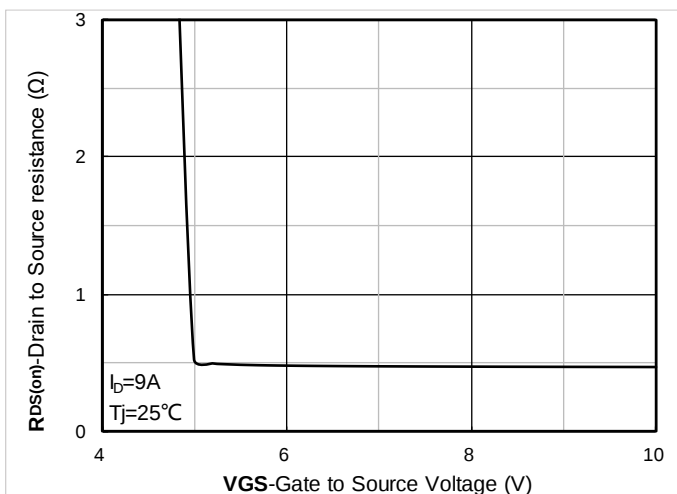


Figure 5. On-Resistance vs. Gate to Source Voltage; typical values

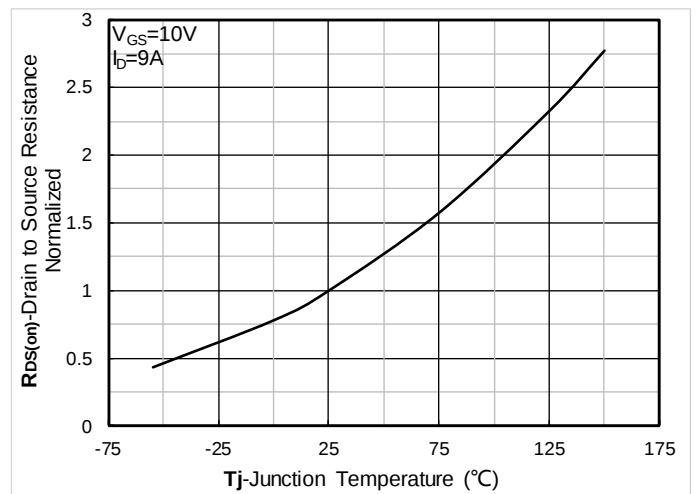


Figure 6. Normalized On-Resistance

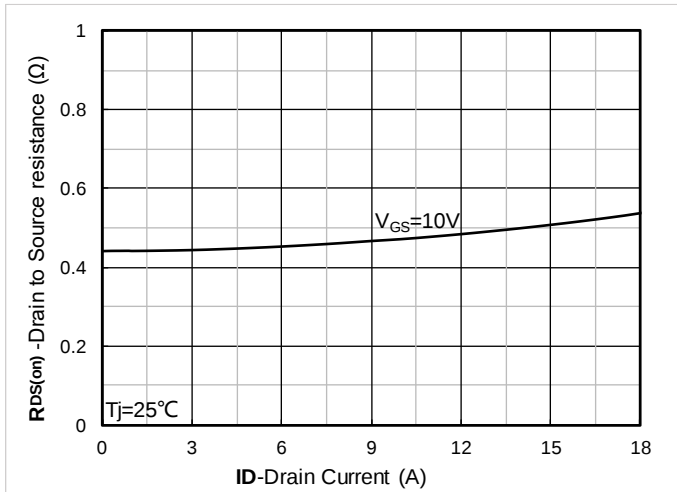


Figure 7. $R_{DS(on)}$ vs. Drain Current; typical values

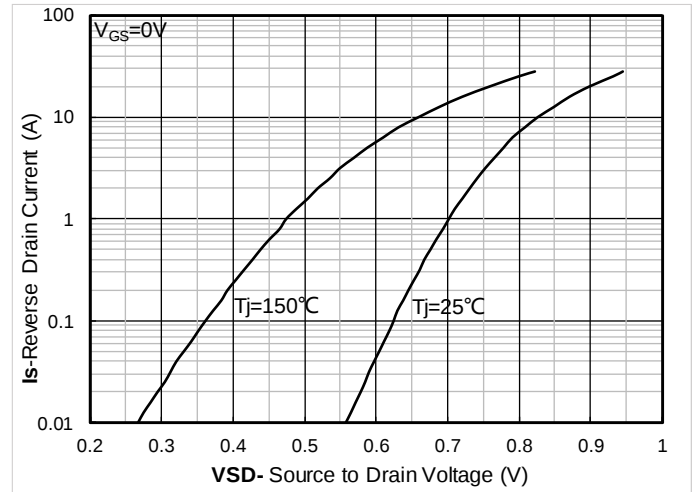


Figure 8. Forward characteristics of reverse diode; typical values

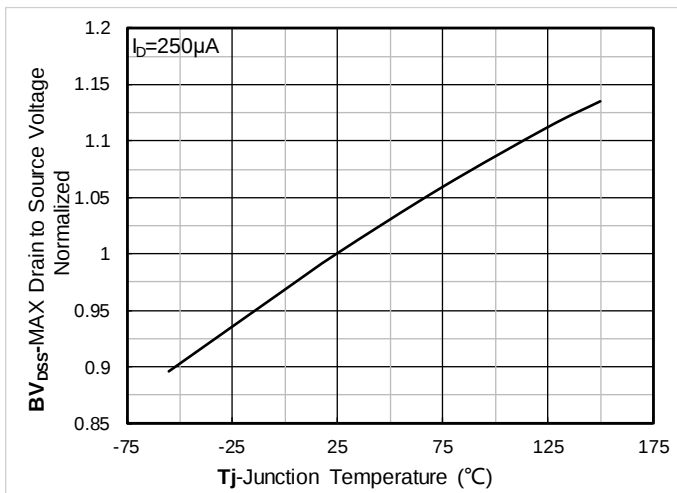


Figure 9. Normalized breakdown voltage

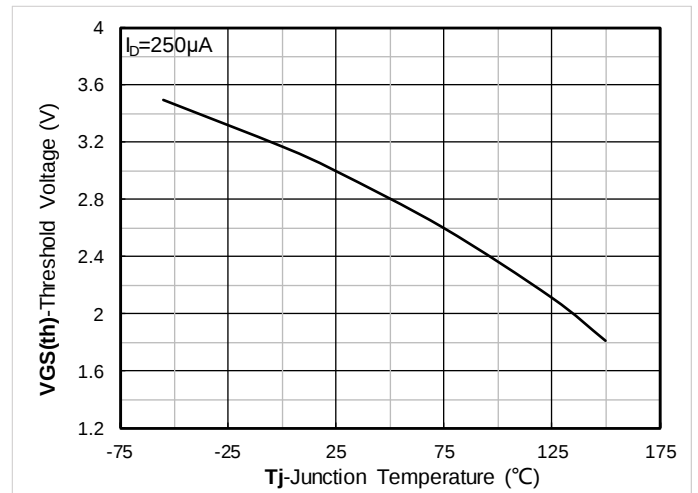


Figure 10. Gate Threshold voltage; typical values

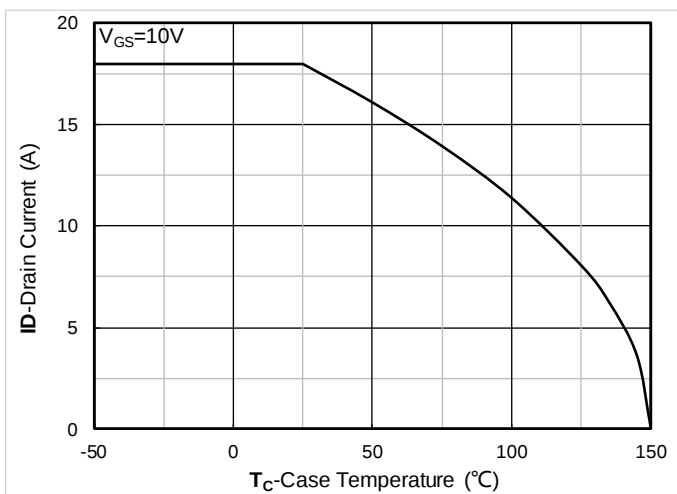


Figure 11. Current dissipation

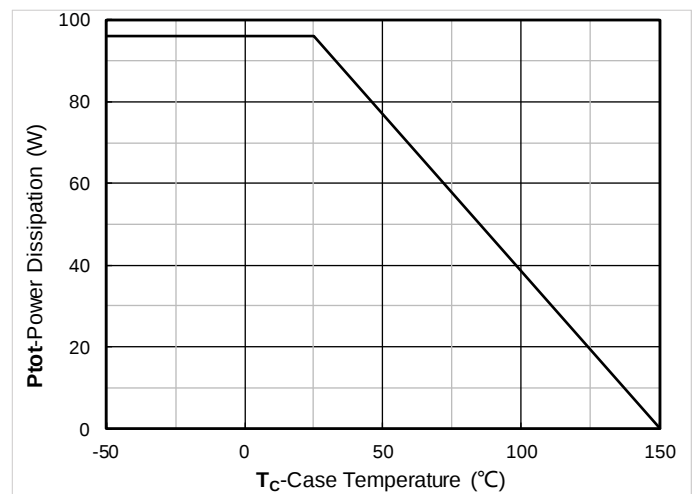


Figure 12. Power dissipation

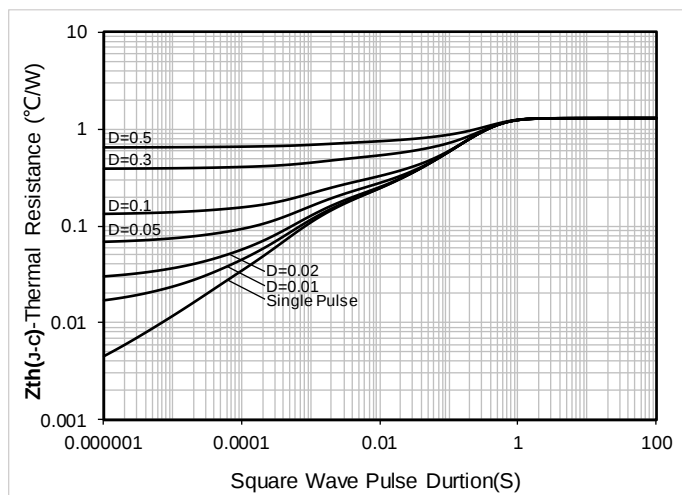


Figure 13. Maximum Transient Thermal Impedance

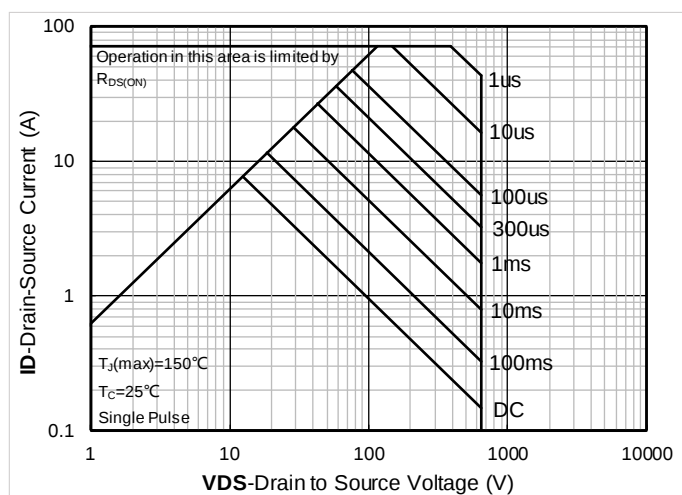
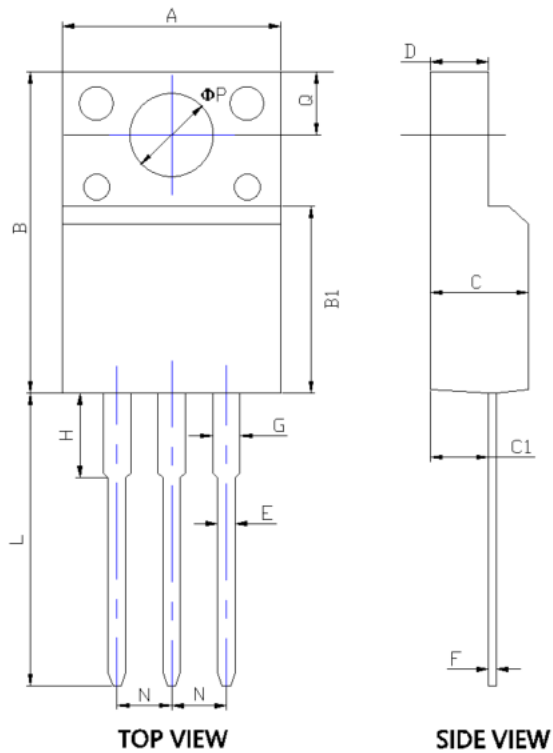


Figure 14. Safe Operation Area



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■ ITO-220AB-E Package information

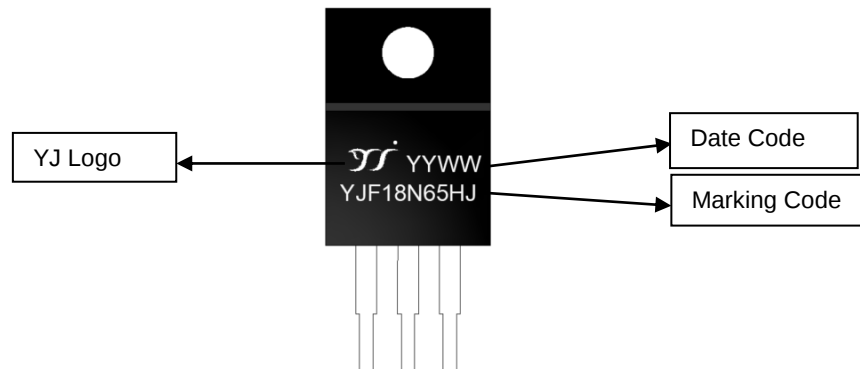


SYMBOL	DIMENSIONS			
	INCHES		Millimeter	
	MIN.	MAX.	MIN.	MAX.
A	0.390	0.406	9.900	10.300
B	0.610	0.633	15.500	16.100
B1	0.350	0.374	8.900	9.500
C	0.181	0.189	4.600	4.800
C1	0.087	0.110	2.200	2.800
D	0.096	0.104	2.450	2.650
E	0.028	0.035	0.700	0.900
F	0.016	0.024	0.400	0.600
G	0.044	0.056	1.120	1.420
H	0.134	0.150	3.400	3.800
L	0.496	0.512	12.600	13.000
N	0.100BSC.		2.540BSC.	
Q	0.126	0.142	3.200	3.600
ΦP	0.122	0.130	3.100	3.300

NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.

■ Marking Information



Note:

1. All marking is at middle of the product body
2. All marking is in laser printing
3. YYWW is date code, "YY" is year, "WW" is week
4. Body color: Black



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