

Features

- Super Junction technology for High Voltage Application
- Excellent package for heat dissipation
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free."Green "Device^(Note 1)
- Lead Free Finish/RoHS Compliant^(Note 2) ("P" Suffix Designates RoHS Compliant. See Ordering Information)

Maximum Ratings

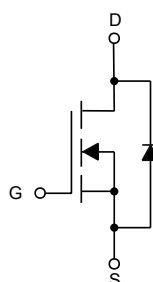
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 70°C/W Junction to Ambient^(Note 3)
- Thermal Resistance: 4.2°C/W Junction to Case

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	635	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current	I_D	3.96	A
		2.50	
	$T_C=25^{\circ}\text{C}$		
	$T_C=100^{\circ}\text{C}$		
Pulsed Drain Current ^(Note 4)	I_{DM}	15.84	A
Total Power Dissipation ^(Note 5)	P_D	29.7	W
Single Avalanche Energy ^(Note 6)	E_{AS}	60	mJ

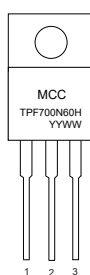
Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. High Temperature Solder Exemption Applied, see EU Directive Annex 7(a)-I.
3. The value of $R_{\theta JA}$ is measured with the device mounted on 1in²FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^{\circ}\text{C}$.
4. Repetitive rating; pulse width limited by max. junction temperature.
5. P_D is based on max. junction temperature, using junction-case thermal resistance.
6. $T_J=25^{\circ}\text{C}$, $V_{DD}=100\text{V}$, $V_{GS}=10\text{V}$, $R_G=25\Omega$, $L=30\text{mH}$.

Internal Structure and Marking Code



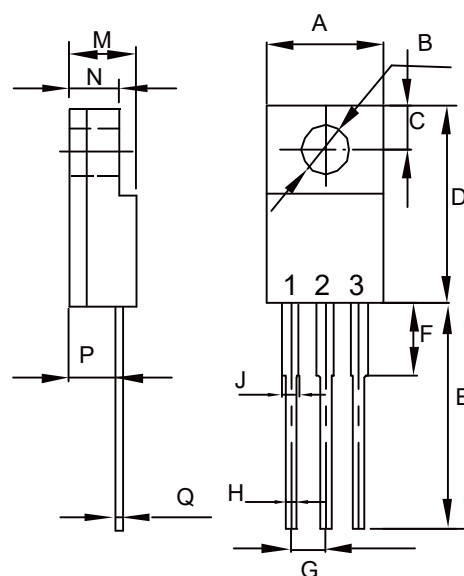
1. Gate
2. Drain
3. Source



4 codes in total
YY is the year
WW is the week

N-CHANNEL Super-Junction Power MOSFET

TO-220F



DIMENSIONS					
DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.392	0.421	9.96	10.70	
B	0.138		3.50		Φ
C	0.106		2.70		TYP.
D	0.567	0.642	14.40	16.30	
E	0.520		13.20		TYP.
F	---	0.177	---	4.50	
G	0.100		2.54		TYP.
H	0.020	0.035	0.50	0.90	
J	0.043	0.053	1.10	1.35	
M	0.169	0.201	4.30	5.10	
N	---	0.140	---	3.56	
P	0.083	0.126	2.10	3.20	
Q	0.020	0.032	0.50	0.80	

Electrical Characteristics @ 25°C (Unless Otherwise Specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250uA	635			V
Gate-Source Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±30V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =650V, V _{GS} =0V			1	μA
Gate-Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	2	3	4	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =10V, I _D =4.5A		540	700	mΩ
Gate Resistance	R _G	f=1MHz, Open Drain		100		Ω
Diode Characteristics						
Continuous Body Diode Current	I _S				3.96	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =4.5A			1.2	V
Reverse Recovery Time	t _{rr}	V _R =300V, I _F =4.5A dI _F /dt=100A/μs		135		ns
Reverse Recovery Charge	Q _{rr}			1024		nC
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} =300V, V _{GS} =0V, f=1MHz		347		pF
Output Capacitance	C _{oss}			10.3		
Reverse Transfer Capacitance	C _{rss}			2.3		
Total Gate Charge	Q _g	V _{DS} =300V, V _{GS} =10V, I _D =4.5A		9.3		nC
Gate-Source Charge	Q _{gs}			1.6		
Gate-Drain Charge	Q _{gd}			5.0		
Turn-On Delay Time	t _{d(on)}	V _{DD} =300V, V _{GS} =10V R _G =3Ω, I _D =4.5A		42		ns
Turn-On Rise Time	t _r			24		
Turn-Off Delay Time	t _{d(off)}			89		
Turn-Off Fall Time	t _f			27		

Curve Characteristics

Fig.1- Typical Output Characteristics

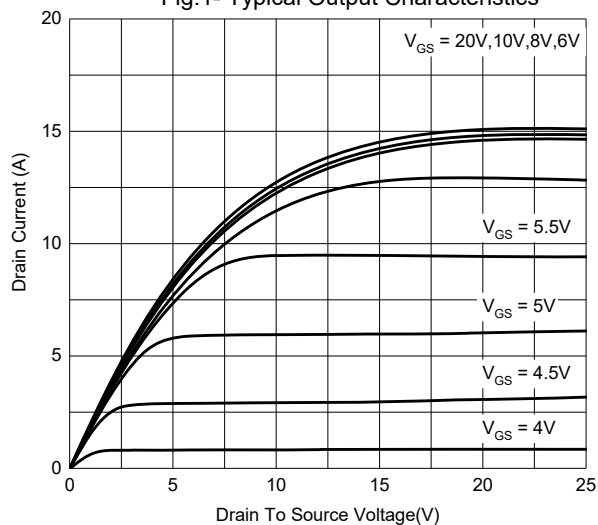


Fig.2- Transfer Characteristics

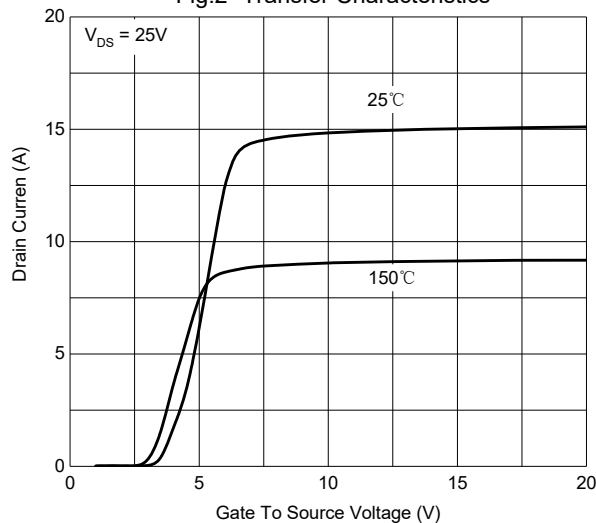


Fig.3- $R_{DS(ON)} - V_{GS}$

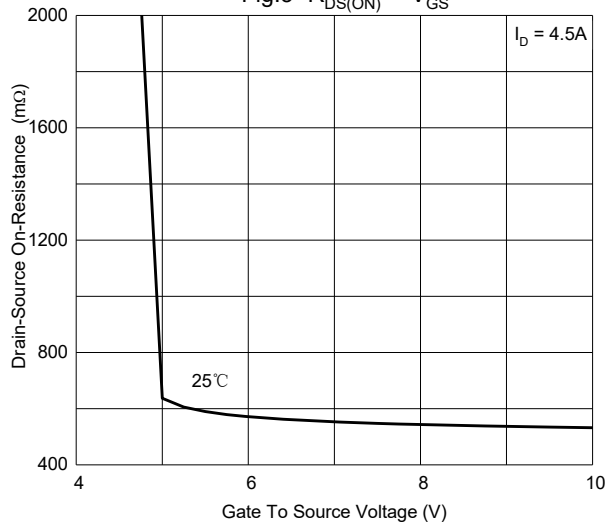


Fig.4- $R_{DS(ON)} - I_D$

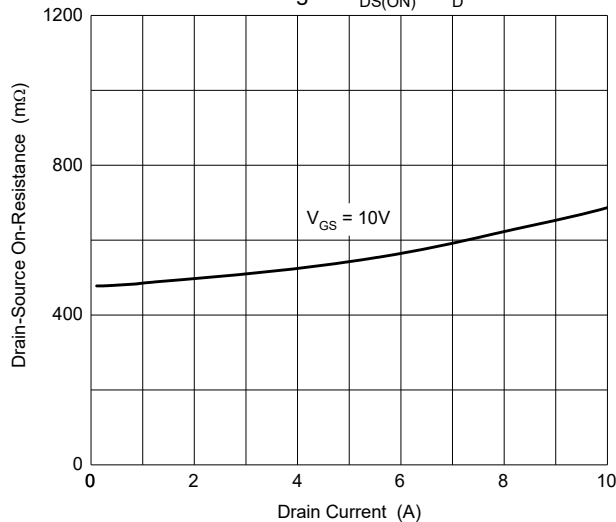


Fig.5- Capacitance Characteristics

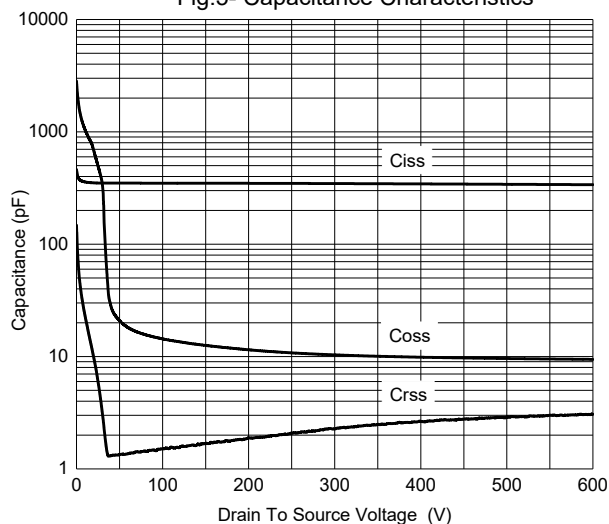
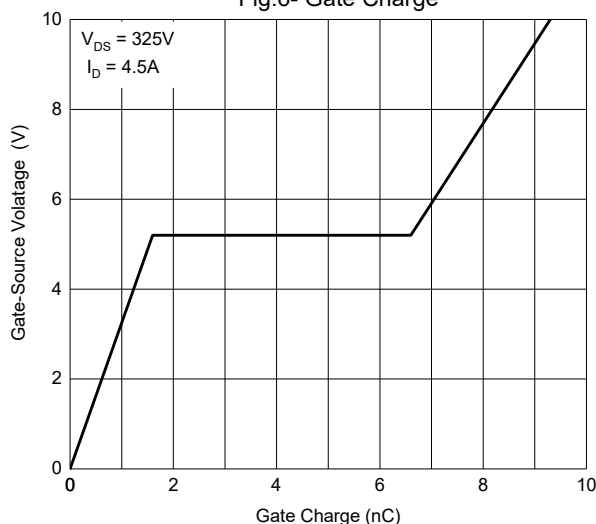


Fig.6- Gate Charge



Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

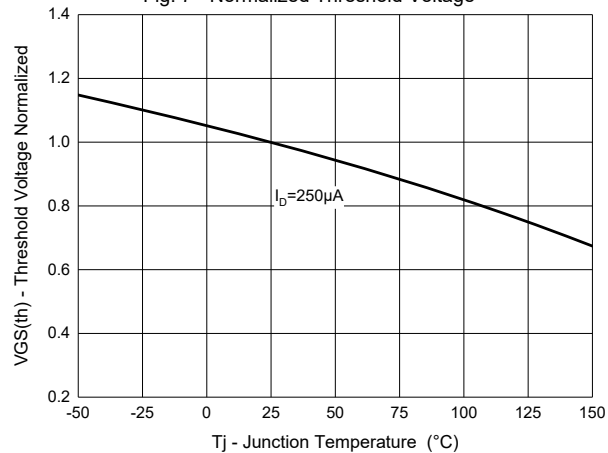


Fig. 8 - Normalized On Resistance Characteristics

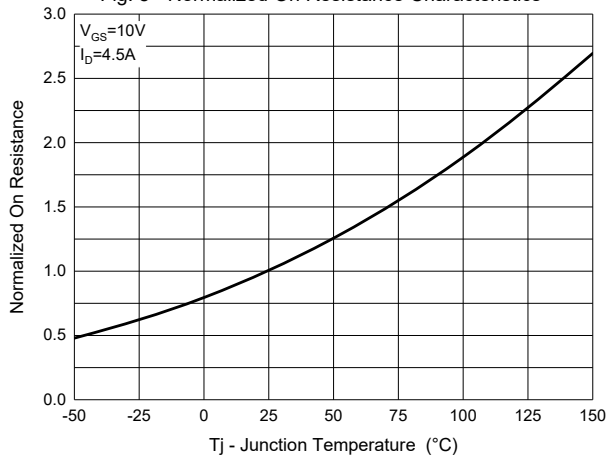


Fig. 9 - I_S - V_{SD}

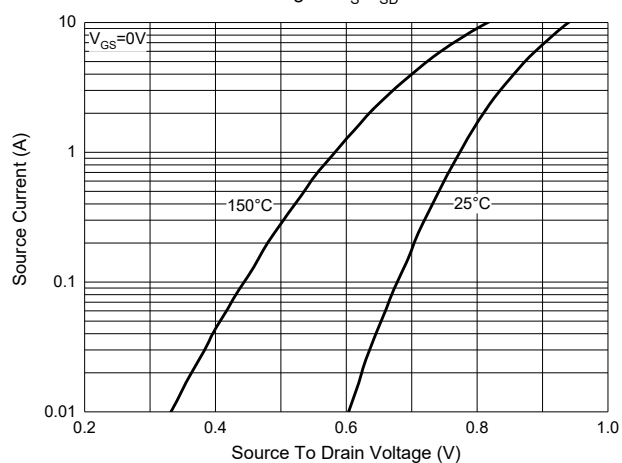


Fig. 10 - Drain Current

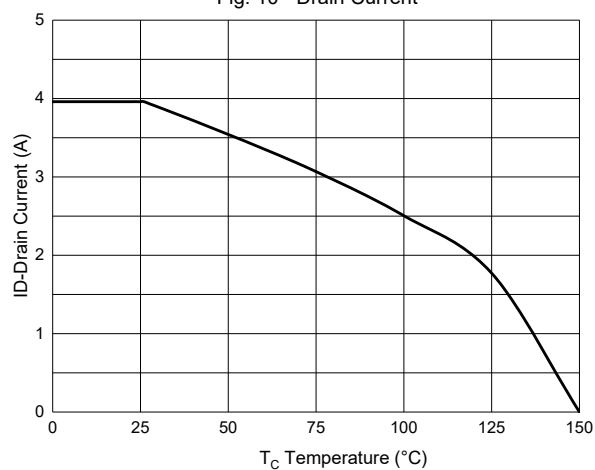
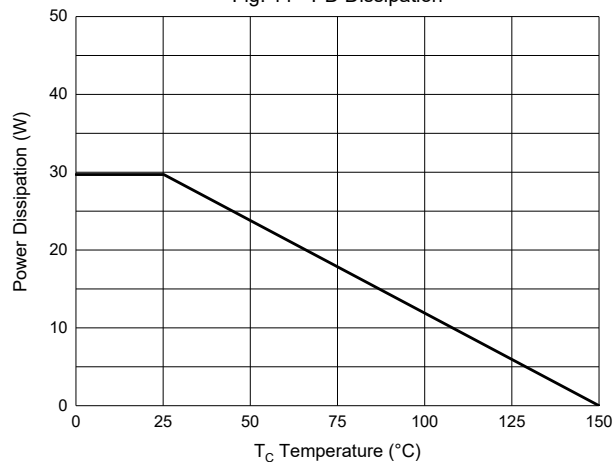


Fig. 11 - PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

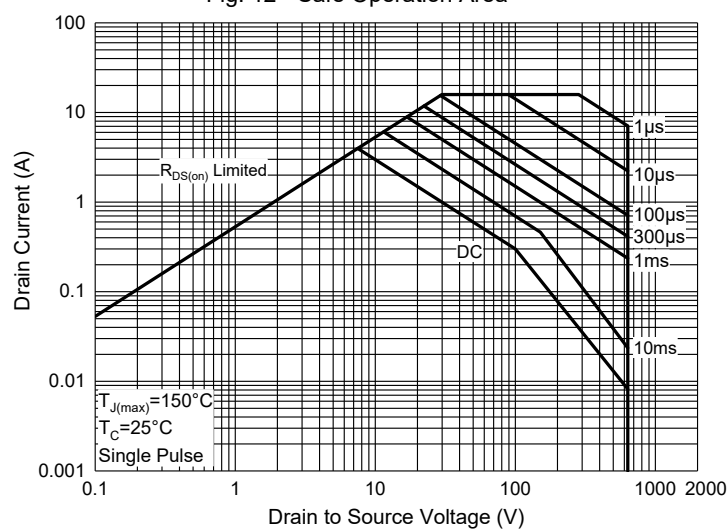
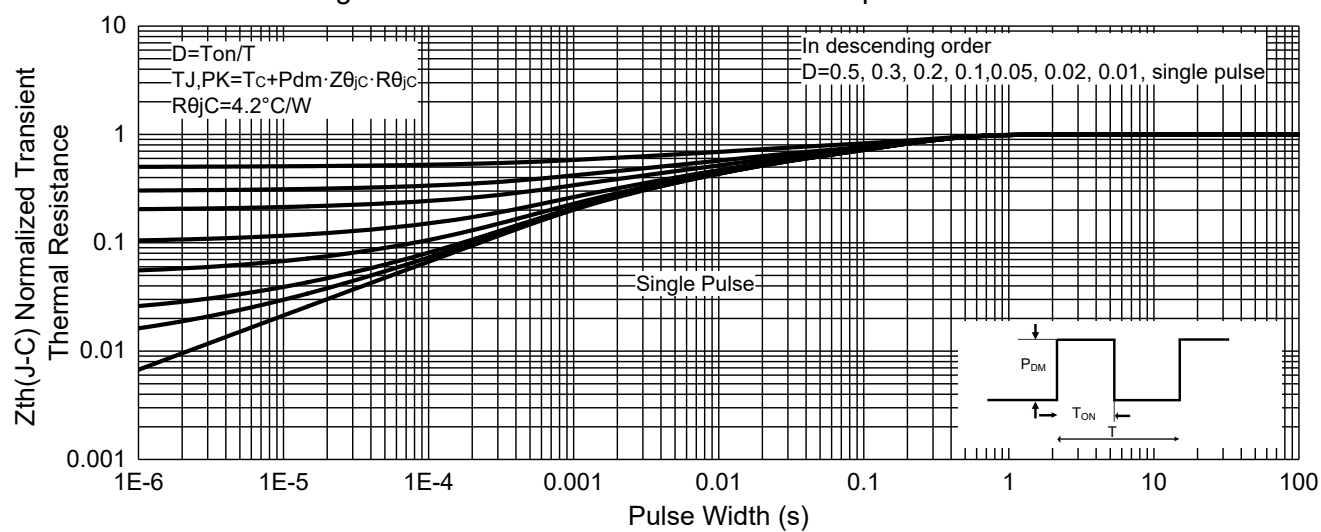


Fig. 13 - Normalized Transient Thermal Impedance



Ordering Information

Device	Packing
Part Number-BP	Bulk: 50pcs/Tube; 1Kpcs/Box; 5Kpcs/Ctn

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