

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	$0.67\Omega@10V$	10A

Feature

- Fast Switching
- Low Gate Charge and $R_{DS(on)}$
- 100% Single Pulse avalanche energy Test

Applications

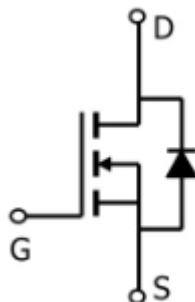
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

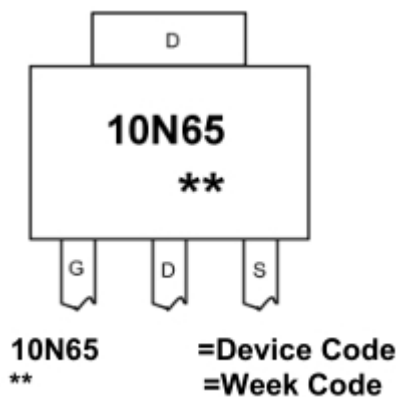


TO-220F(G:1 D:2 S:3)

Circuit diagram



Marking



Absolute maximum ratings

(T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	650	V
Gate-Source Voltage	V _{GS}	±30	V
Continuous Drain Current ¹ (T _A = 25°C)	I _D	10	W
Pulsed Drain Current ¹	I _{DM}	40	A
Single Pulse Avalanche Energy ³	E _{AS}	97	mJ
Total Power Dissipation (T _A = 25°C)	P _D	126	W
Thermal Resistance Junction- Case ¹	R _{θJC}	0.99	°C/ W
Storage Temperature	T _{STG}	-55~ +150	°C
Junction Temperature	T _J	-55~ +150	°C

Electrical characteristics

($T_A=25^{\circ}\text{C}$, unless otherwise noted)

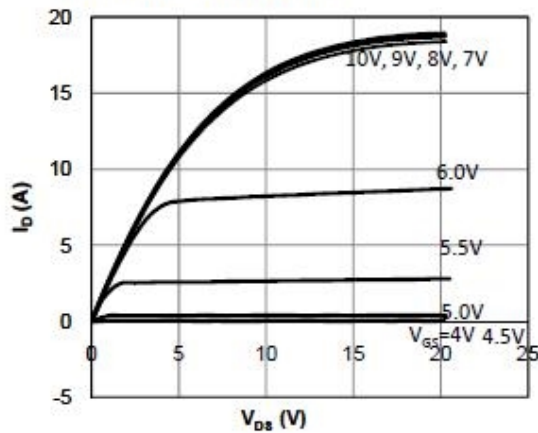
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 650V, V_{GS} = 0V$			1	μA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	μA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 3A$		0.67	0.85	Ω
Dynamic characteristics ⁴						
Input Capacitance	C_{iss}	$V_{DS} = 100V, V_{GS} = 0V,$ $f = 1MHz$		773		pF
Output Capacitance	C_{oss}			33		
Reverse Transfer Capacitance	C_{rss}			22		
Switching Characteristics						
Total Gate Charge(4.5V)	Q_g	$V_{DS} = 480V, V_{GS} = 10V,$ $I_D = 5.5A$		22		nC
Gate-Source Charge	Q_{gs}			5.3		
Gate-Drain Charge	Q_{gd}			8.8		
Turn-On Delay Time	$T_{d(on)}$	$V_{DD} = 400V, V_{GS} = 10V,$ $R_G = 27\Omega, I_D = 5.5A$		20		nS
Rise Time	T_r			15		
Turn-Off Delay Time	$T_{d(off)}$			74		
Fall Time	T_f			43		

Note :

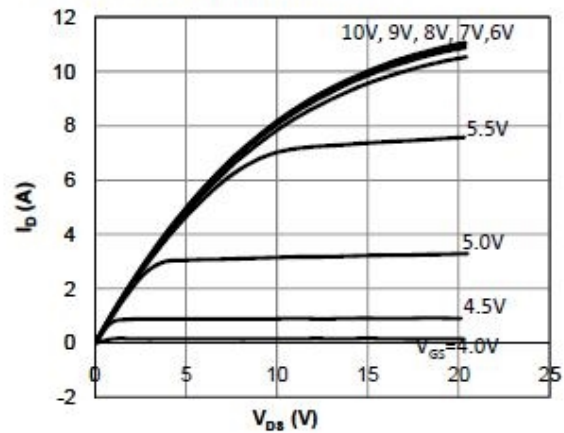
1. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. The EAS data shows Max. rating . The test condition is $R_G=30\Omega, L=60mH$

Typical Characteristics

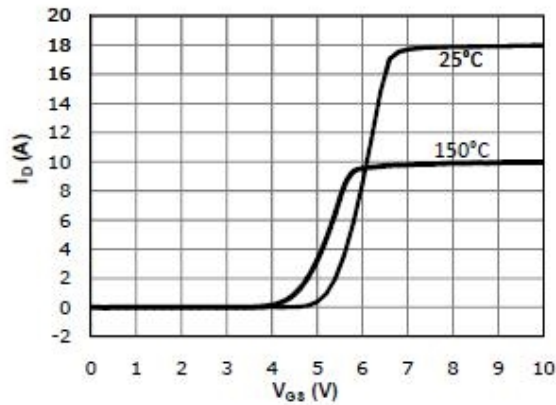
Output Characteristics ($T_J=25^\circ\text{C}$)



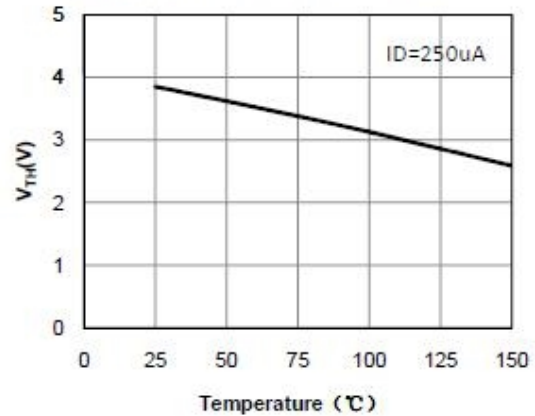
Output Characteristics ($T_J=150^\circ\text{C}$)



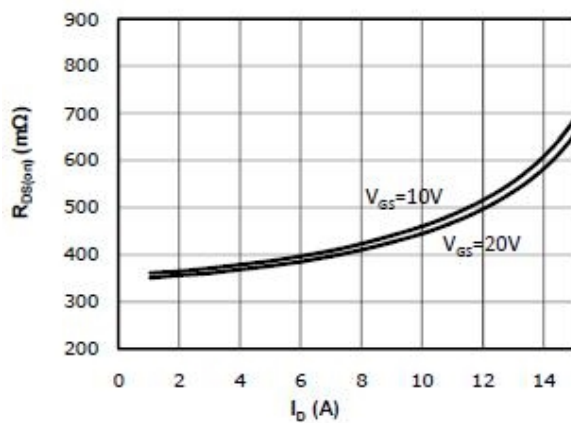
Transfer Characteristics



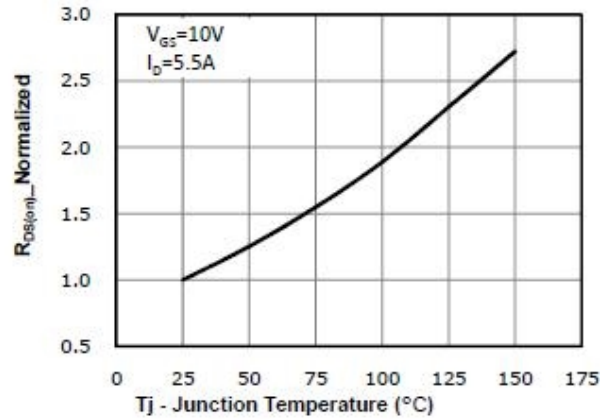
V_{TH} Vs T_J Temperature Characteristics



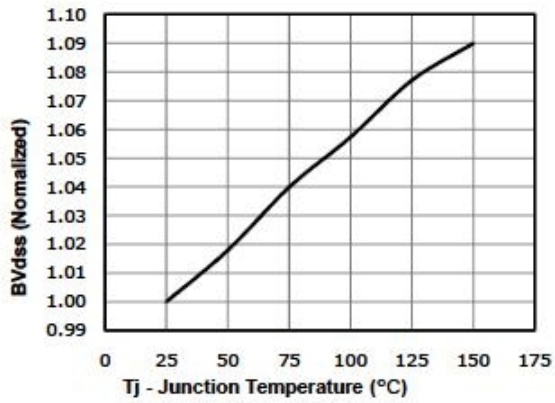
$R_{DS(on)}$ Vs I_{DS} Characteristics ($T_C=25^\circ\text{C}$)



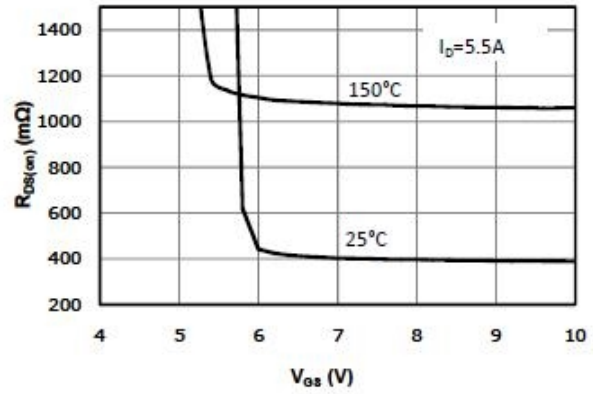
$R_{DS(on)}$ vs. Temperature



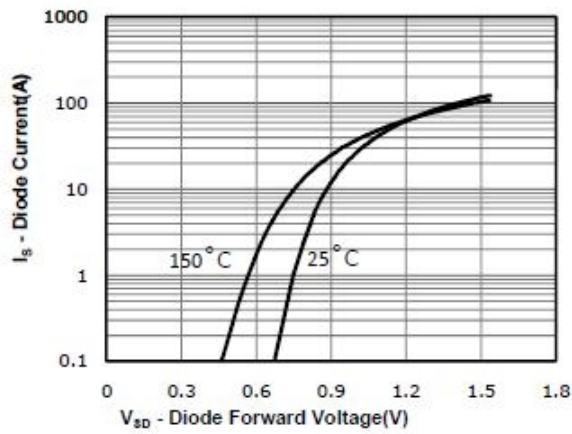
BVDSS vs. Temperature



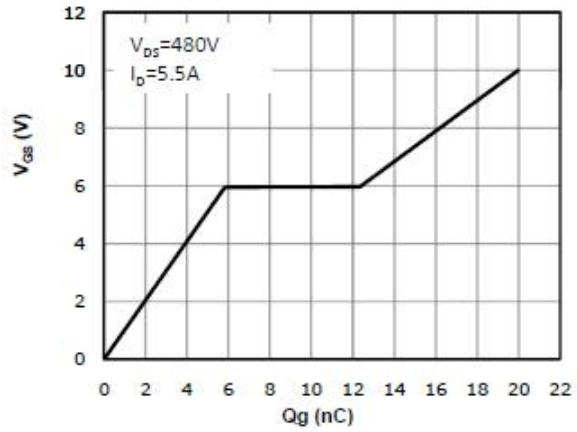
Rds(on) vs Gate Voltage



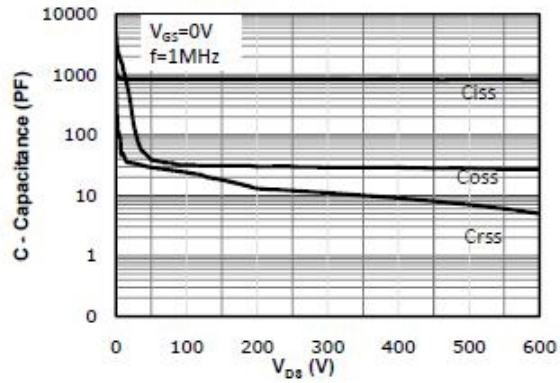
Body-diode Forward Characteristics



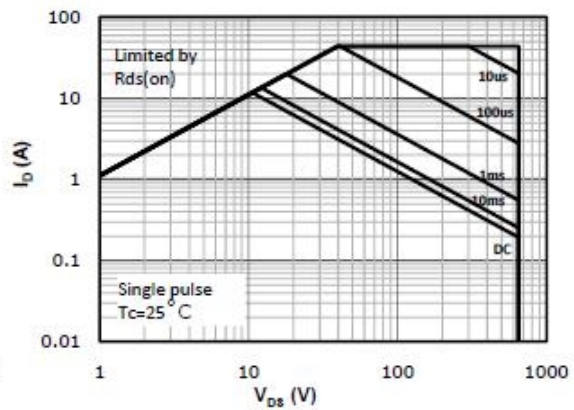
Gate Charge Characteristics

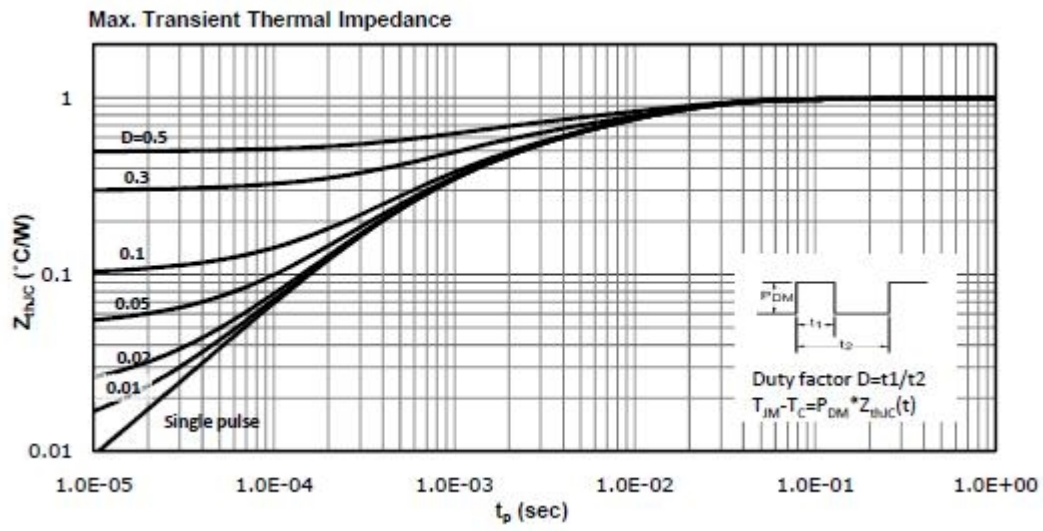


Capacitance Characteristics

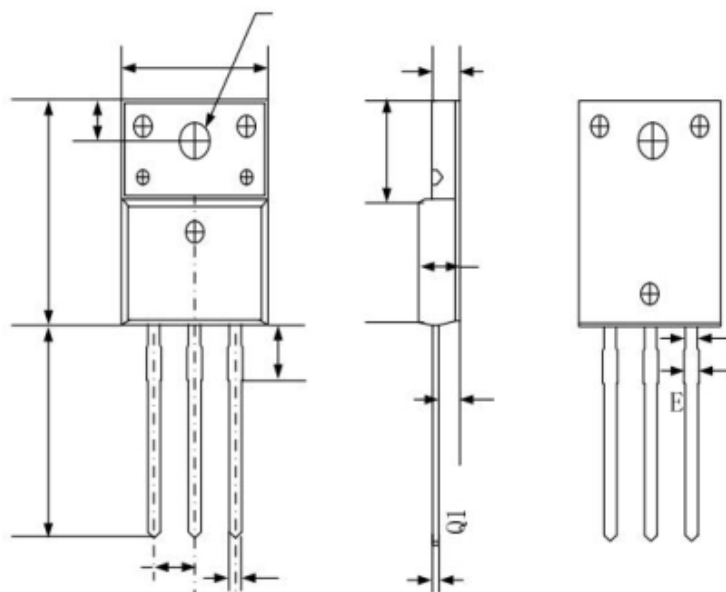


Safe Operating Area





TO-220F Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.50	4.83	0.18	0.19
b	0.70	0.91	0.03	0.04
b1	1.20	1.47	0.05	0.06
b2	1.10	1.38	0.04	0.05
c	0.45	0.63	0.02	0.02
D	15.67	16.07	0.62	0.63
e	2.54 BSC		0.10 BSC	
E	9.96	10.36	0.39	0.41
F	2.34	2.74	0.09	0.11
G	6.48	6.90	0.26	0.27
L	12.68	13.30	0.50	0.52
L1	3.13	3.50	0.12	0.14
Q	2.56	2.93	0.10	0.12
Q1	3.20	3.40	0.13	0.13
ΦR	3.08	3.28	0.12	0.13