

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
500V	$0.28\Omega@10V$	20A

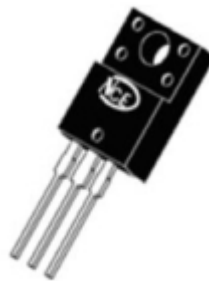
Feature

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

Application

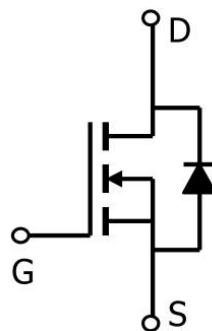
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

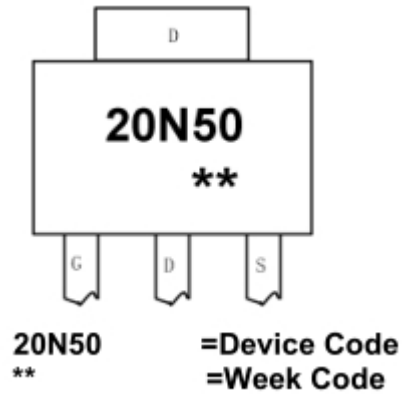


TO-220F

Circuit diagram



Marking



Absolute maximum ratings

(T_a=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	500	V
Gate-Source Voltage	V _{GS}	±30	V
Continuous Drain Current ¹ (TC=25°C)	I _D	20	A
Pulsed Drain Current ²	I _{DM}	80	A
Single Pulse Avalanche Energy ³	E _{AS}	809	mJ
Total Power Dissipation(TC=25°C)	P _D	60	W
Thermal Resistance Junction-Case ¹	R _{θJC}	2.08	°C/W
Storage Temperature Range	T _{STG}	-55 to 150	°C
Operating Junction Temperature Range	T _J	-55 to 150	°C

Electrical characteristics

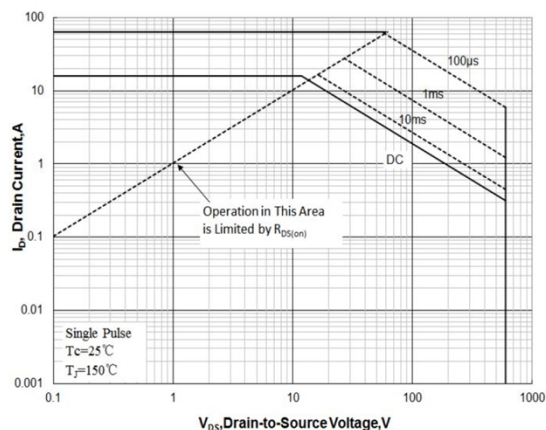
($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	$V_{GS} = 0V, I_D = 250\mu A$	500			V
Bvdss Temperature Coefficient	$\Delta BV_{DSS}/\Delta T$	ID=1mA, Reference25°C		0.36		V/°C
Drain-Source Leakage Current	I_{DSS}	$V_{DS} = 400V, V_{GS} = 0V,$ $T_J = 25^\circ C$			1	uA
Gate-body leakage current	I_{GSS}	$V_{GS} = \pm 30V, V_{DS} = 0V$			± 100	uA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	3	4	V
Static Drain-Source On-Resistance ¹	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 9A$		0.28	0.35	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS} = 25V, V_{GS} = 0V,$ f=1MHz		2620		pF
Output Capacitance	C_{oss}			220		
Reverse Transfer Capacitance	C_{rss}			6		
Switching Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 400V, V_{GS} = 10V,$ $I_D = 20A$		46		pF
Gate Source Charge	Q_{gs}			12.5		
Gate Drain Charge	Q_{gd}			15.5		
Turn-On Delay Time	$T_{d(on)}$	$V_{DD} = 250V, V_{GS} = 10V$, $R_G = 10\Omega, I_D = 20A$		28		nS
Rise Time	T_r			47		
Turn-Off Delay Time	$T_{d(off)}$			57		
Fall Time	T_f			40		

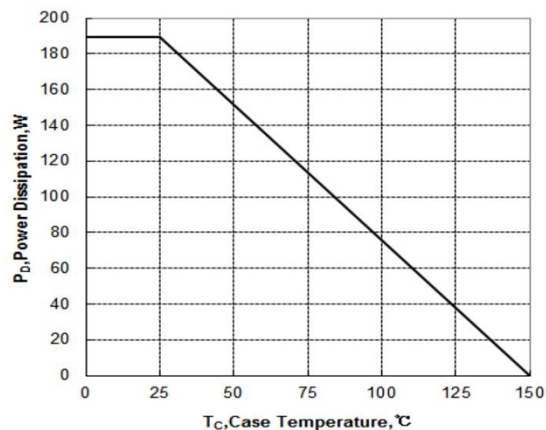
Notes:

1. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ 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 $R_G = 25\Omega, L = 10mH$

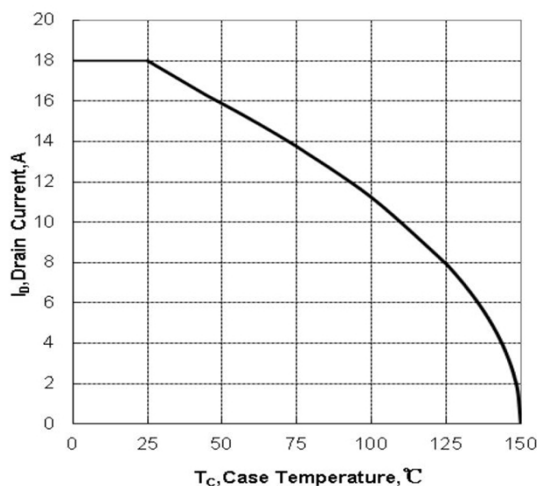
Typical Characteristics



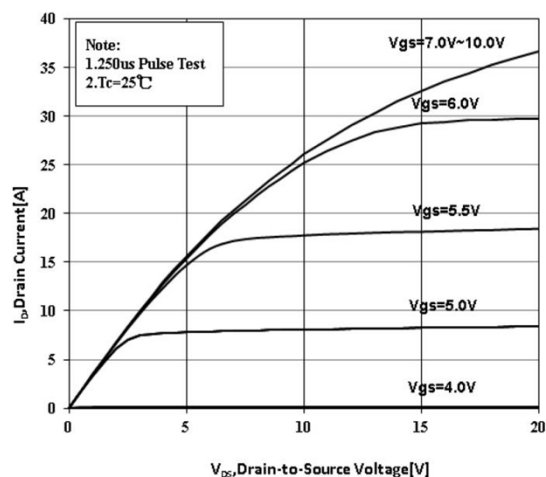
Maximum Forward Bias Safe Operating Area



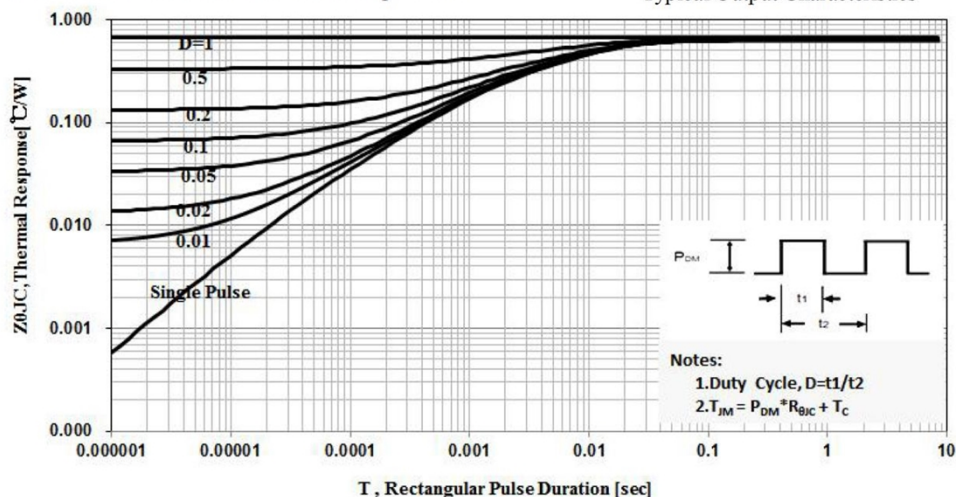
Maximum Power dissipation vs Case Temperature



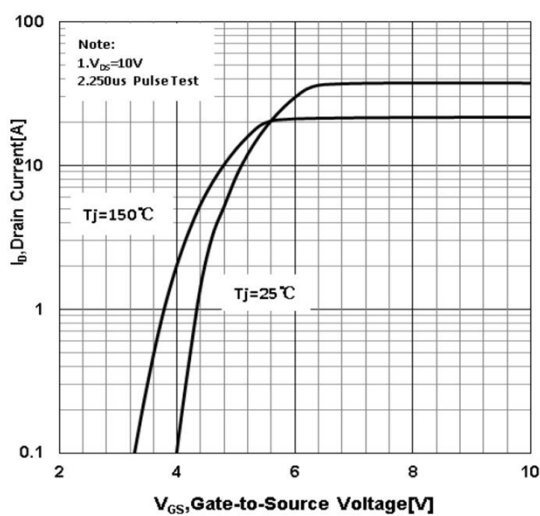
Maximum Continuous Drain Current vs Case Temperature



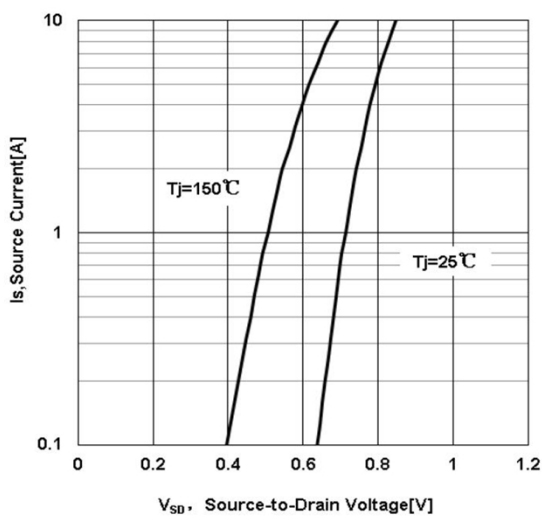
Typical Output Characteristics



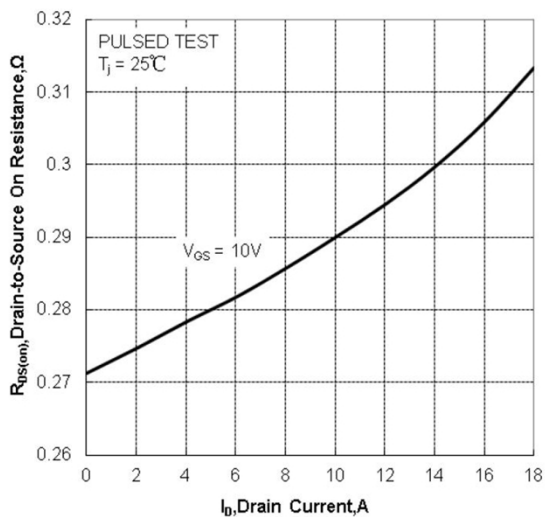
Maximum Effective Thermal Impedance , Junction to Case



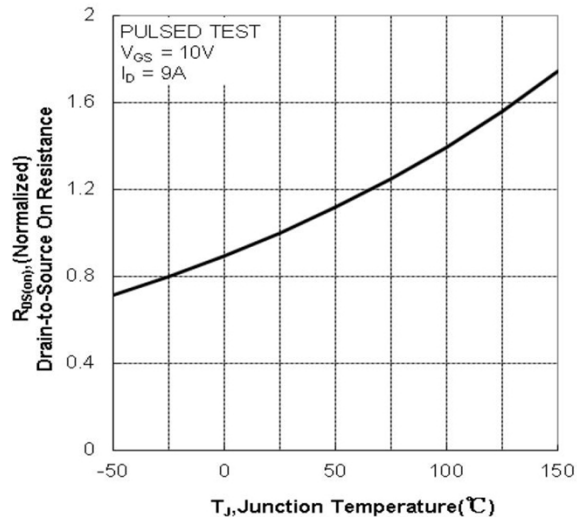
Typical Transfer Characteristics



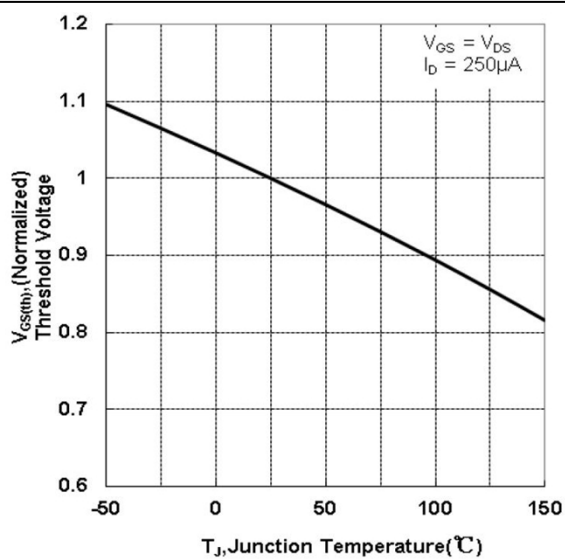
Typical Body Diode Transfer Characteristics



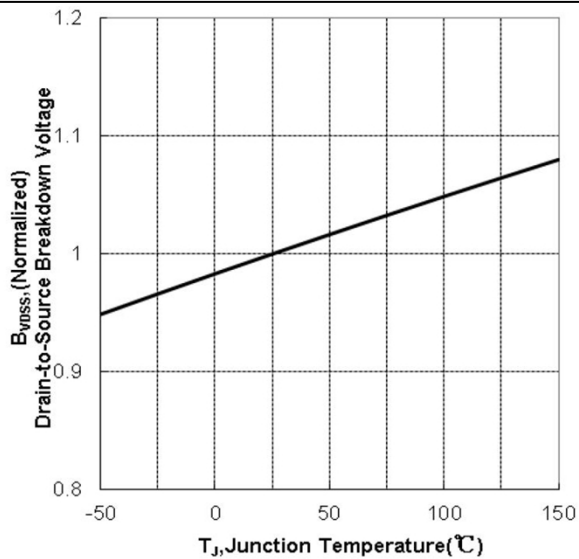
Typical Drain to Source ON Resistance
vs Drain Current



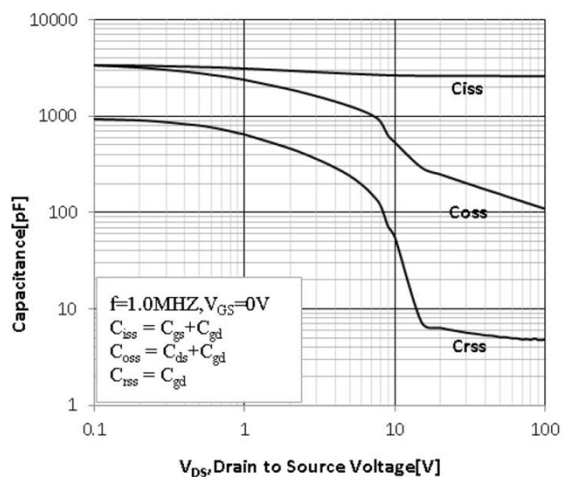
Typical Drian to Source on Resistance
vs Junction Temperature



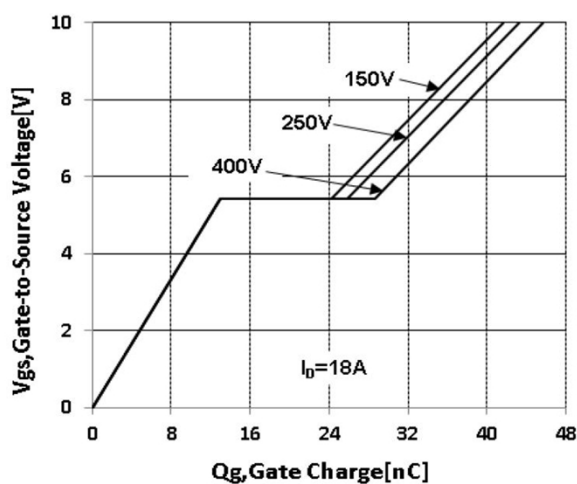
Typical Theshold Voltage vs Junction Temperature



Typical Breakdown Voltage vs Junction Temperature

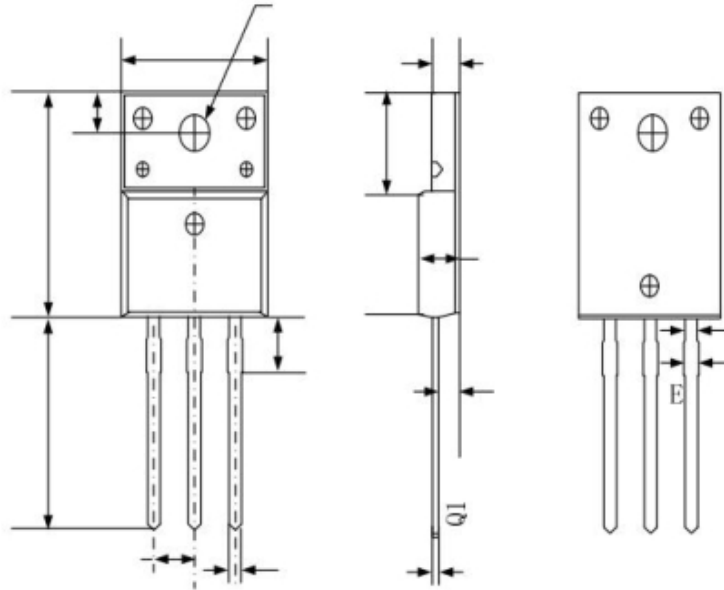


Typical Capacitance vs Drain to Source Voltage



Typical Gate Charge vs Gate to Source Voltage

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