Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	I_D
650V	0.28Ω@10V	20A

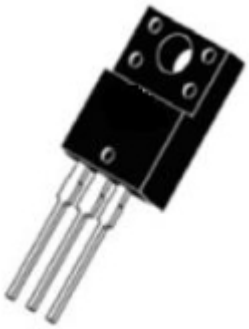
Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

Application

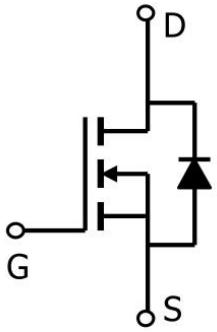
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

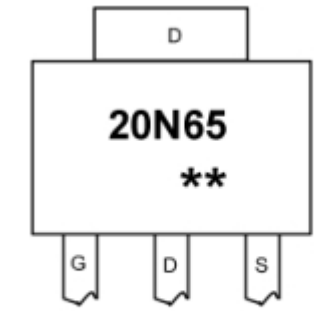


TO-220F(G:1 D:2 S:3)

Circuit diagram



Marking



20N65 =Device Code
** =Week Code

Absolute maximum ratings

(T_a=25℃ 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](TC=25℃)	I_D	20	A
Pulsed Drain Current[2]	I_{DM}	80	A
Single Pulse Avalanche Energy[3]	E_{AS}	445	mJ
Total Power Dissipation(TC=25℃)	P_D	85	W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	1.47	℃/W
Storage Temperature Range	T_{STG}	-55 to 150	℃
Operating Junction Temperature Range	T_J	-55 to 150	℃

Electrical characteristics

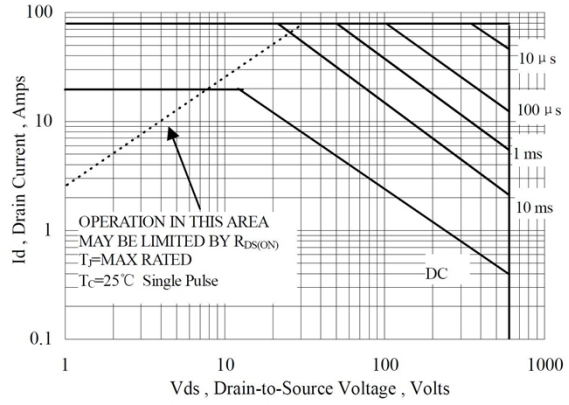
(T_A=25℃, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	BV_{DSS}	V_{GS} = 0V, I_D =250μA	650			V
Drain-Source Leakage Current	I_{DSS}	V_{DS} =520V,V_{GS} = 0V, T_J=25℃			1	uA
Gate-body leakage current	I_{GSS}	V_{GS} =±30V , V_{DS}=0V			±100	uA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	3	4	5	V
Static Drain-Source On-Resistance[1]	$R_{DS(on)}$	V_{GS} =10V, I_D =10A		0.28	0.35	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=25V, V_{GS}=0V, f=1MHz		2431		pF
Output Capacitance	C_{oss}			217		
Reverse Transfer Capacitance	C_{rss}			21		
Switching Characteristics						
Total Gate Charge	Q_g	V_{DS}=325V, V_{GS}=10V, I_D =20A		64		pF
Gate Source Charge	Q_{gs}			13		
Gate Drain Charge	Q_{gd}			24		
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=325V, V_{GS}=10V, R_G=25Ω, I_D =20A		34		nS
Rise Time	T_r			81		
Turn-Off Delay Time	$T_{d(off)}$			178		
Fall Time	T_f			93		

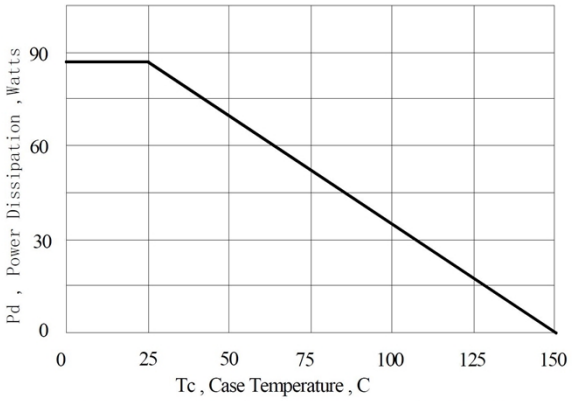
Notes:

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 ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating . The test condition is R_G =30Ω ,L=10mH

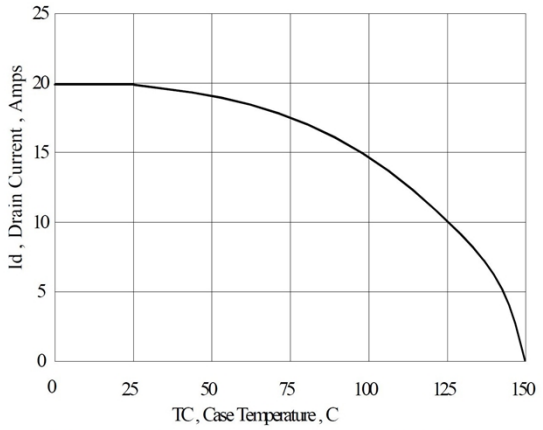
Typical Characteristics



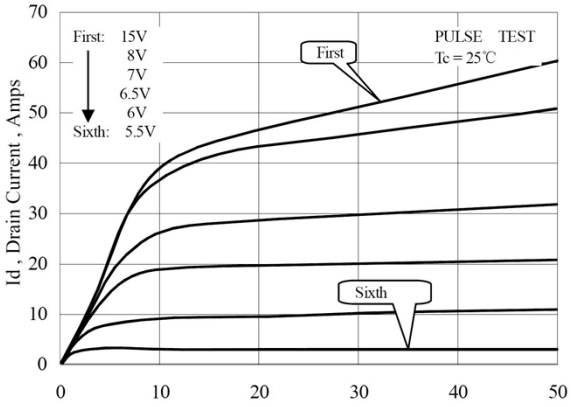
Maximum Forward Bias Safe Operating Area



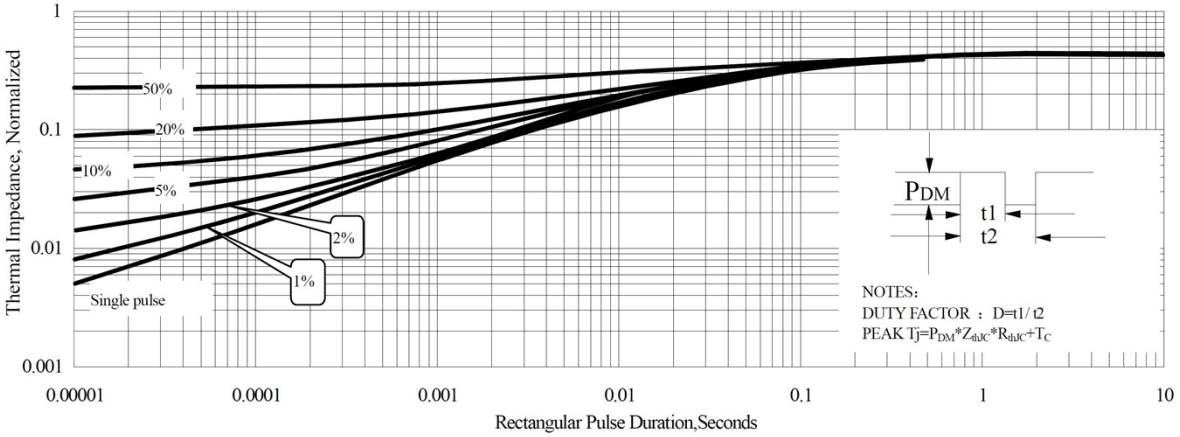
Maximum Power Dissipation vs Case Temperature



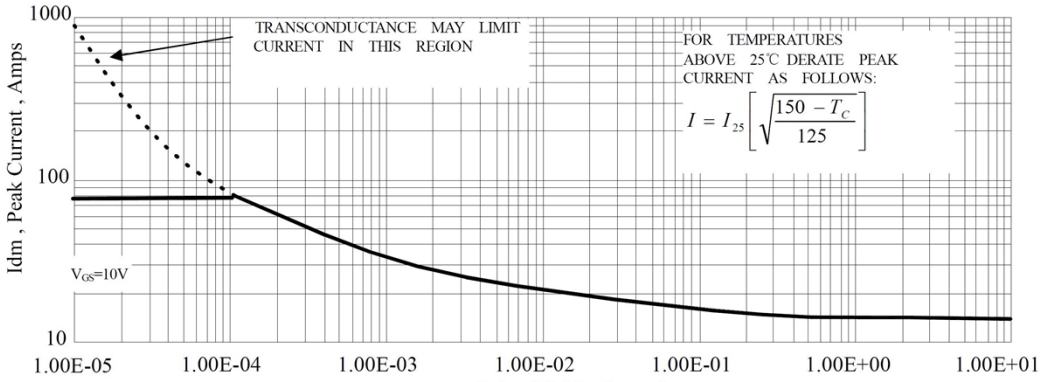
Maximum Continuous Drain Current vs Case Temperature



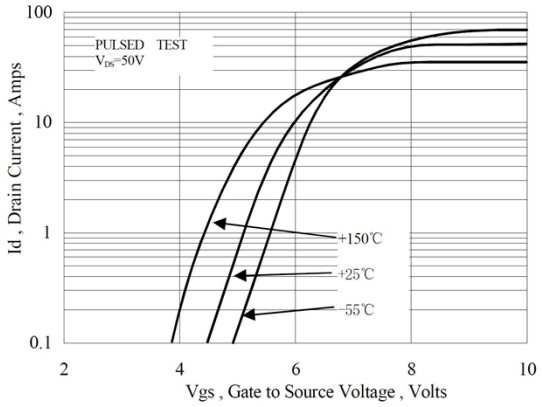
Output Characteristics



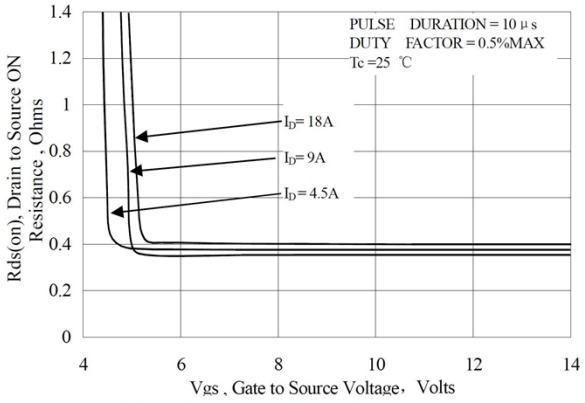
Maximum Effective Thermal Impendance , Junction to Case



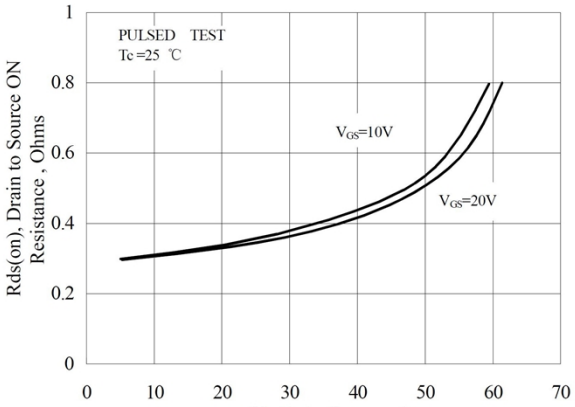
MaximumPeak Current Capability



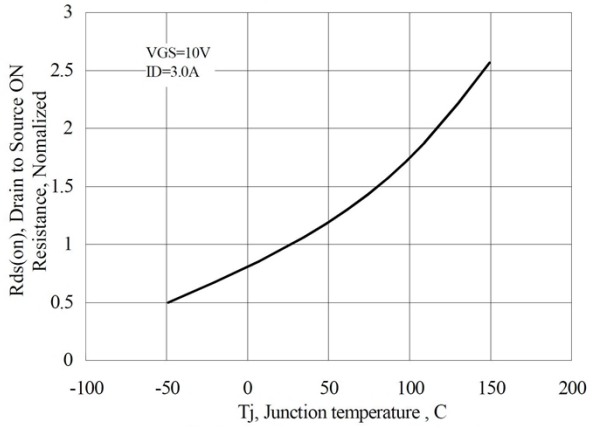
Typical Transfer Characteristics



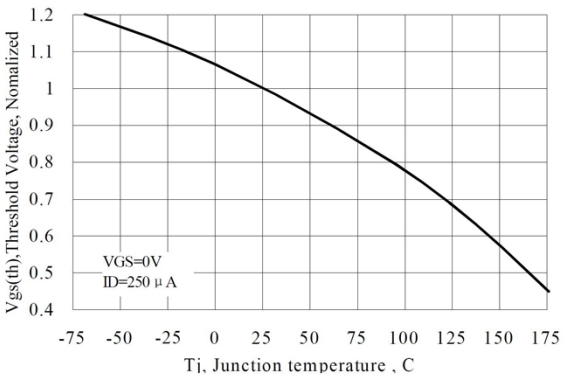
Typical Drain to Source ON Resistance vs Gate Voltage and Drain Current



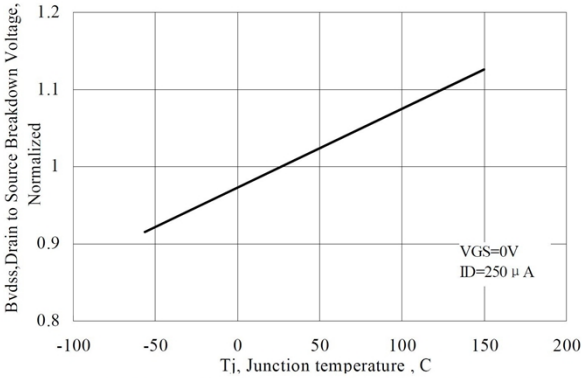
Typical Drain to Source ON Resistance vs Drain Current



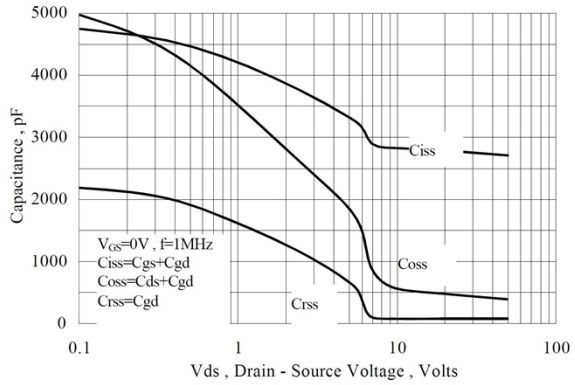
Typical Drian to Source on Resistance vs Junction Temperature



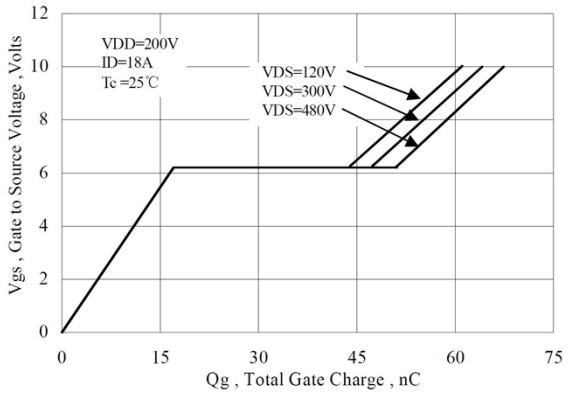
Typical Theshold Voltage vs Junction Temperature

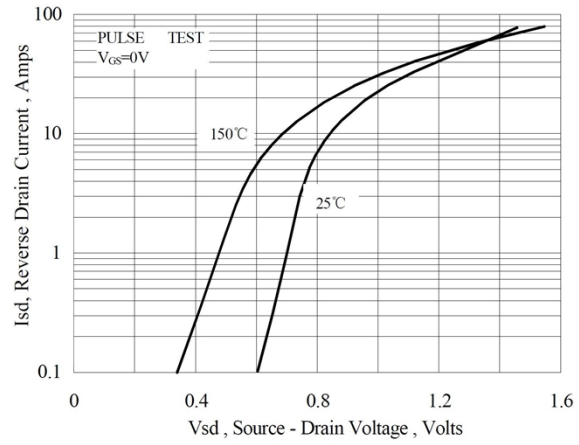


Typical Breakdown Voltage vs Junction Temperature

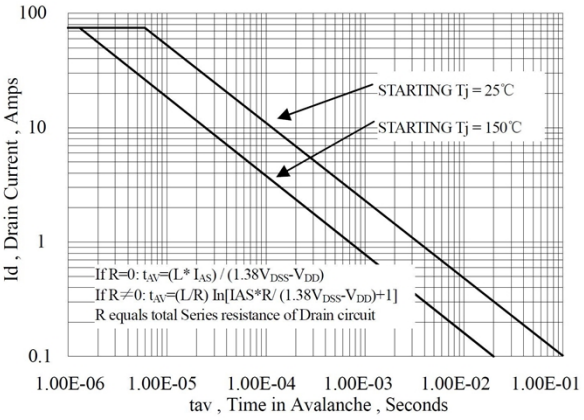


Typical Capacitance vs Drain to Source Voltage



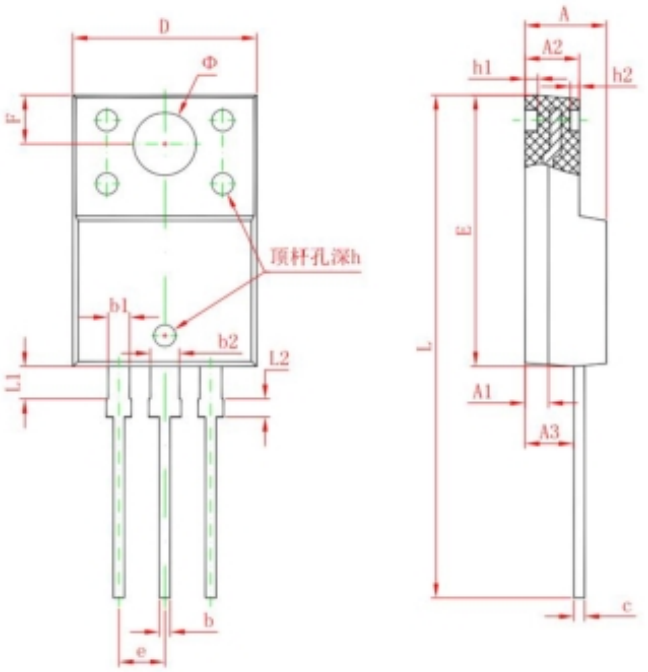


Typical Body Diode Transfer Characteristics



Unclamped Inductive Switching Capability

TO-220F Package Information



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	4.300	4.700
A1	1.300 REF.	
A2	2.800	3.200
A3	2.500	2.900
b	0.500	0.750
b1	1.100	1.350
b2	1.500	1.750
c	0.500	0.750
D	9.960	10.360
E	14.800	15.200
e	2.540 TYP.	
F	2.700 REF.	
Φ	3.500 REF.	
h	0.000	0.300
h1	0.800 REF.	
h2	0.500 REF.	
L	28.000	28.400
L1	1.700	1.900
L2	0.900	1.100