

## Product Summary

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

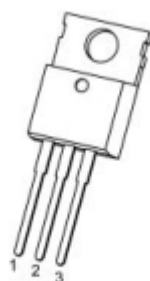
## Feature

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

## Application

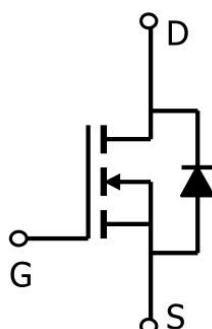
- DC-DC Converter
- Ideal for high-frequency switching and synchronous rectification

## Package

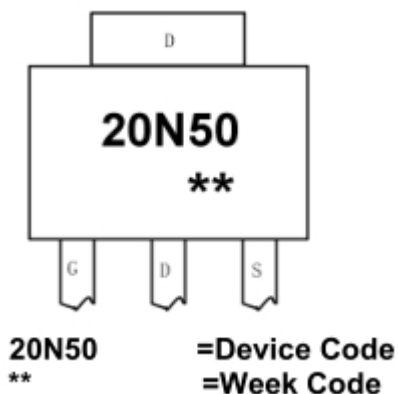


TO-220-3L-C(G:1 D:2 S:3)

## Circuit diagram



## Marking



## Absolute maximum ratings

(T<sub>a</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	500	V
Gate-Source Voltage	V <sub>GS</sub>	±30	V
Continuous Drain Current <sup>1</sup> (TC=25°C)	I <sub>D</sub>	20	A
Pulsed Drain Current <sup>2</sup>	I <sub>DM</sub>	80	A
Single Pulse Avalanche Energy <sup>3</sup>	E <sub>AS</sub>	809	mJ
Total Power Dissipation(TC=25°C)	P <sub>D</sub>	190	W
Thermal Resistance Junction-Case <sup>1</sup>	R <sub>θJC</sub>	0.65	°C/W
Storage Temperature Range	T <sub>STG</sub>	-55 to 150	°C
Operating Junction Temperature Range	T <sub>J</sub>	-55 to 150	°C

## Electrical characteristics

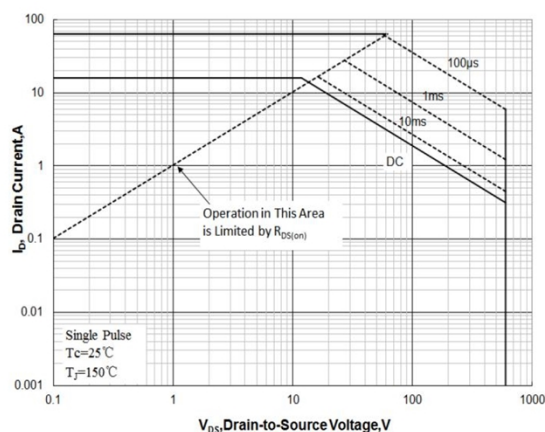
( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

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 <sup>1</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 9A$		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		

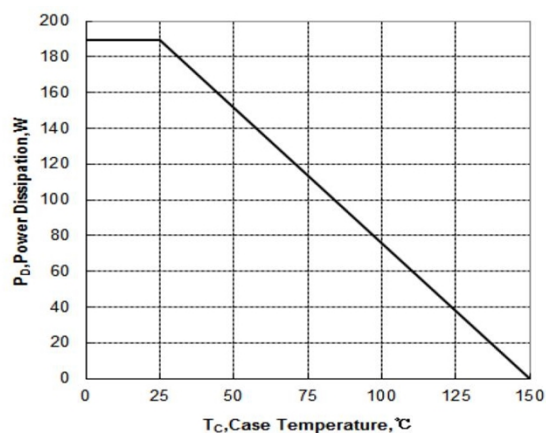
### Notes:

1. The data tested by surface mounted on a 1 inch<sup>2</sup> 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  $R_G = 25\Omega, L = 10mH$

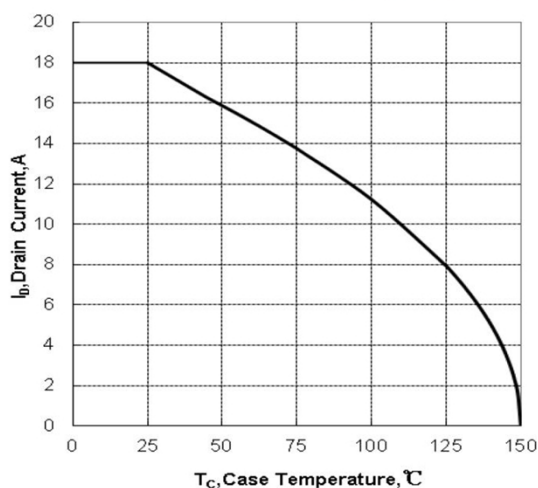
## Typical Characteristics



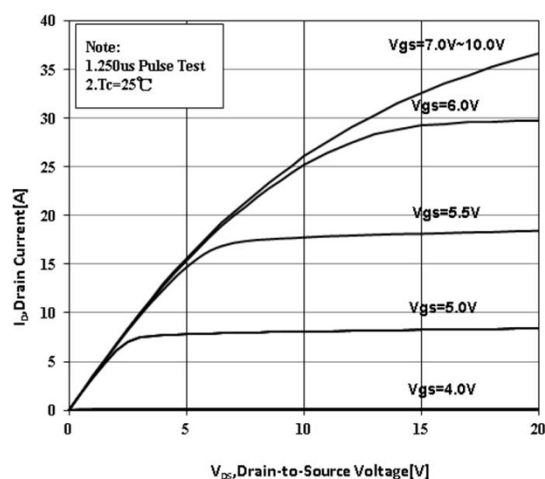
Maximum Forward Bias Safe Operating Area



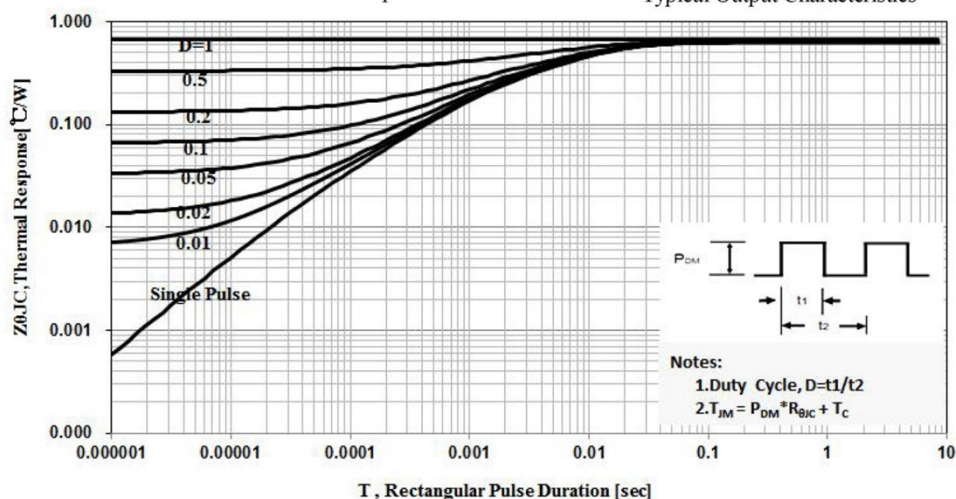
Maximum Power dissipation vs Case Temperature



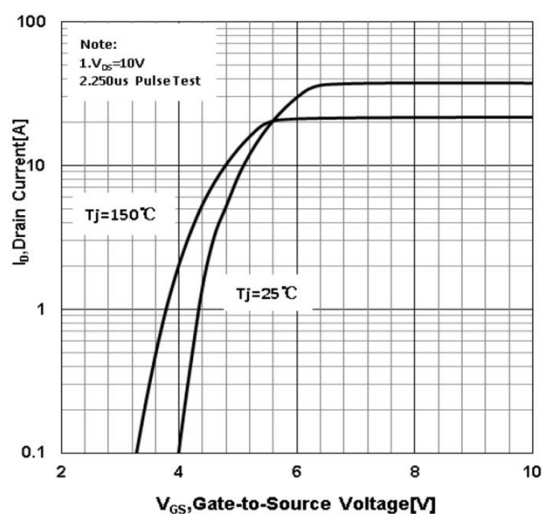
Maximum Continuous Drain Current vs Case Temperature



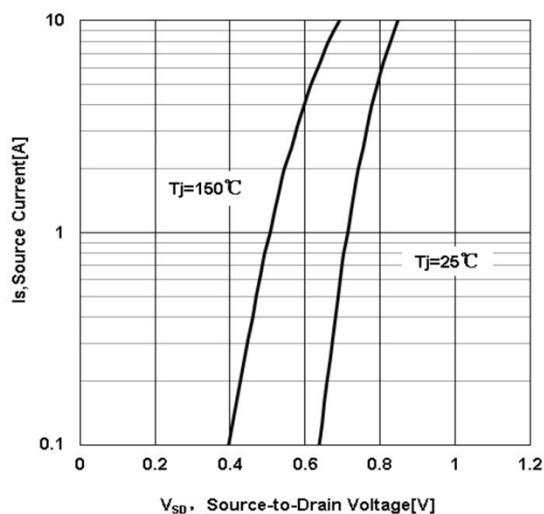
Typical Output Characteristics



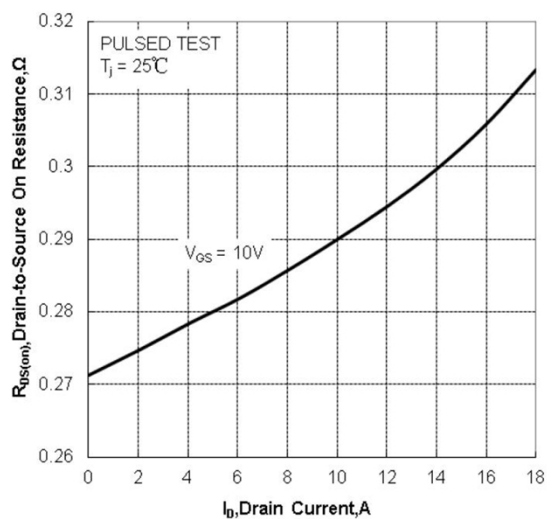
Maximum Effective Thermal Impedance, Junction to Case



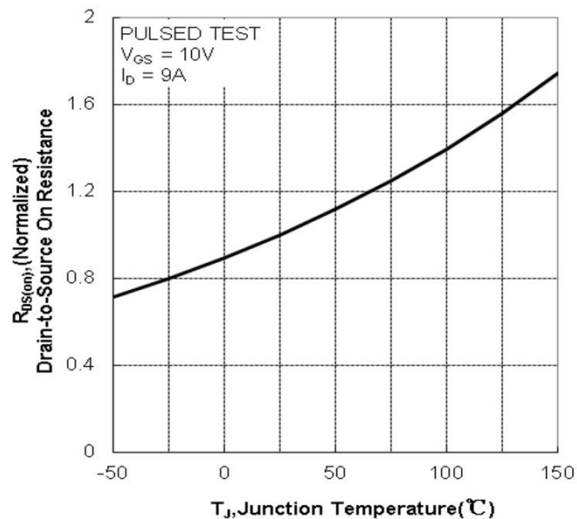
Typical Transfer Characteristics



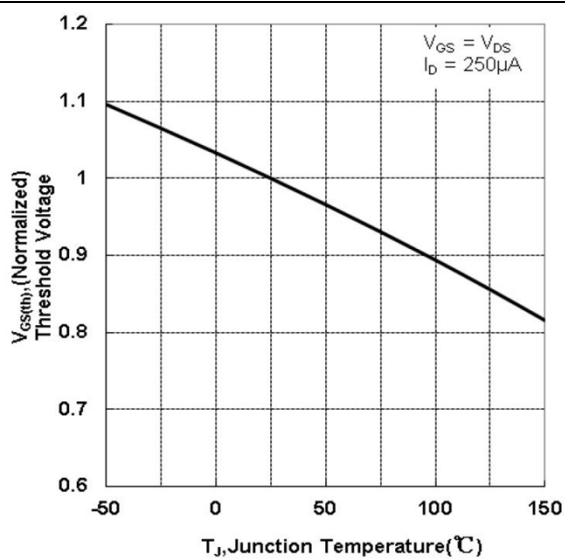
Typical Body Diode Transfer Characteristics



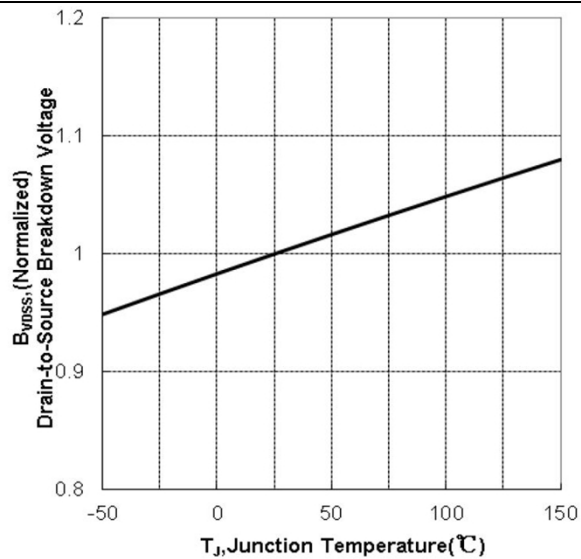
Typical Drain to Source ON Resistance  
vs Drain Current



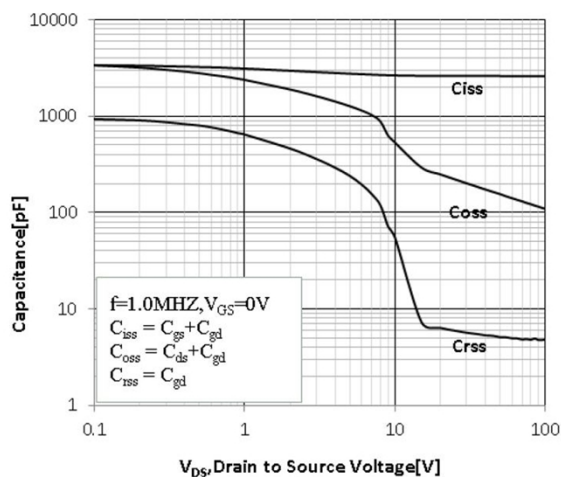
Typical Drian to Source on Resistance  
vs Junction Temperature



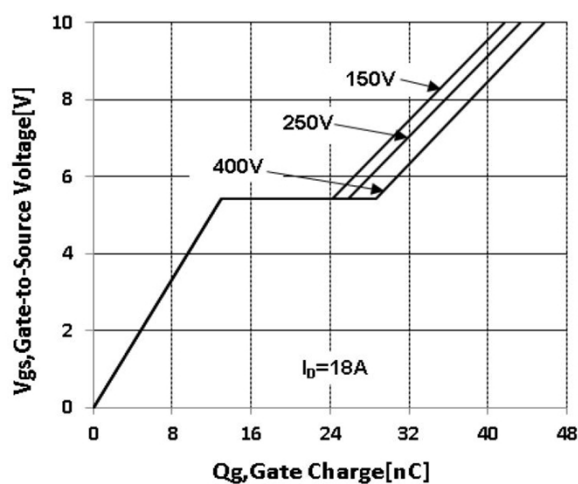
Typical Theshold Voltage vs Junction Temperature



Typical Breakdown Voltage vs Junction Temperature

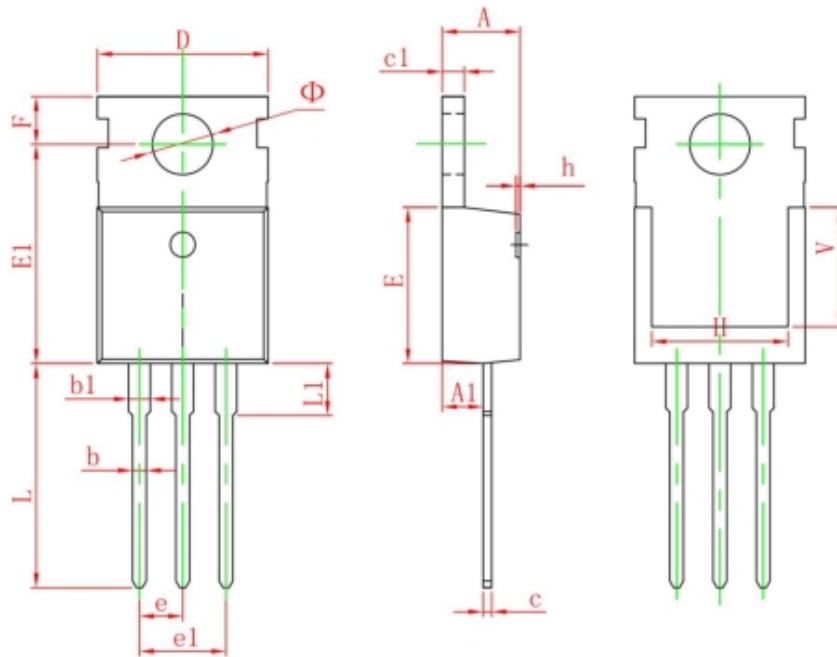


Typical Capacitance vs Drain to Source Voltage



Typical Gate Charge vs Gate to Source Voltage

## TO-220-3L-C Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	9.910	10.250	0.390	0.404
E	8.950	9.750	0.352	0.384
E1	12.650	13.050	0.498	0.514
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	6.900 REF.		0.276 REF.	
Φ	3.400	3.800	0.134	0.150