

## Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
40V	3.5mΩ@10V	130A
	5.5mΩ@4.5V	

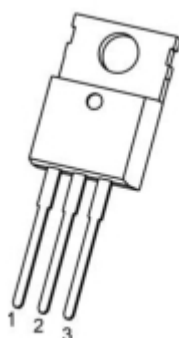
## Feature

- Fast Switching
- High density cell design for ultra low Rdson
- Excellent package for good heat dissipation
- 100% Single Pulse avalanche energy Test

## Application

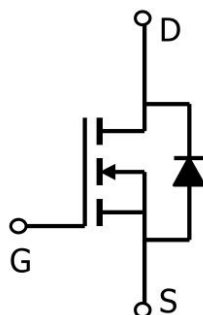
- Load switching
- PWM Application
- Power Management

## Package



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

## 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>	40	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous(Tc=25°C)	I <sub>D</sub>	130	A
Pulsed Drain Current	I <sub>DM</sub>	520	A
Maximum Power Dissipation(Tc=25°C)	P <sub>D</sub>	125	W
Single pulse avalanche energy <sup>(1)</sup>	E <sub>AS</sub>	306	mJ
Thermal Resistance,Junction-to-Case <sup>(2)</sup>	R <sub>θJC</sub>	1.0	°C/W
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to 175	°C

## Electrical characteristics

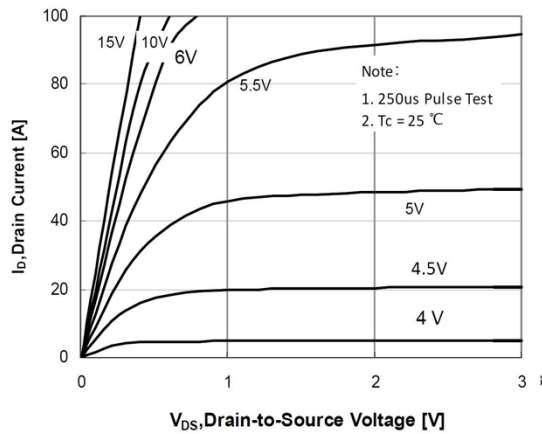
( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV (BR)DSS	V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA	40			V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =32V,V <sub>GS</sub> = 0V			1	uA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V , V <sub>DS</sub> =0V			±100	uA
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.6	2.5	V
Drain-Source On-State Resistance <sup>3</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =75A		3.5 5.5	5 8	mΩ
Dynamic Characteristics						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		8980		pF
Output Capacitance	C <sub>Oss</sub>			520		
Reverse Transfer Capacitance	C <sub>rss</sub>			415		
Switching Characteristics						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =32V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V		175		pF
Gate-Source Charge	Q <sub>gs</sub>			47		
Gate-Drain Charge	Q <sub>gd</sub>			32		
Turn-On Delay Time	T <sub>d(on)</sub>	V <sub>DD</sub> =30V, I <sub>D</sub> =75A, R <sub>L</sub> =1Ω, R <sub>GEN</sub> =10Ω, V <sub>GS</sub> =10V		48		nS
Rise Time	T <sub>r</sub>			83		
Turn-Off Delay Time	T <sub>d(off)</sub>			175		
Fall Time	T <sub>f</sub>			61		
Diode Characteristics						
Drain to Source Diode Forward Voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A			1.2	V

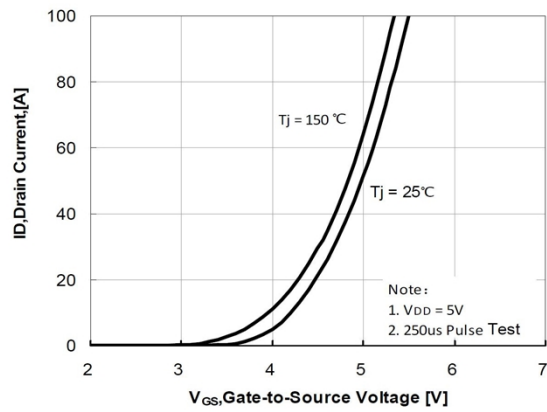
### Note:

1. E<sub>AS</sub> condition :  $T_J = 25^{\circ}\text{C}, V_{DD} = 20V, V_G = 10V, L = 0.5mH, R_g = 25\Omega$
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

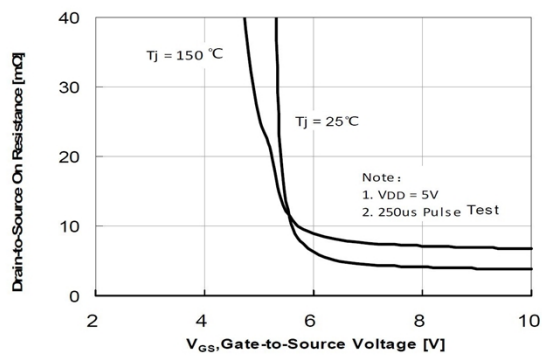
## Typical Characteristics



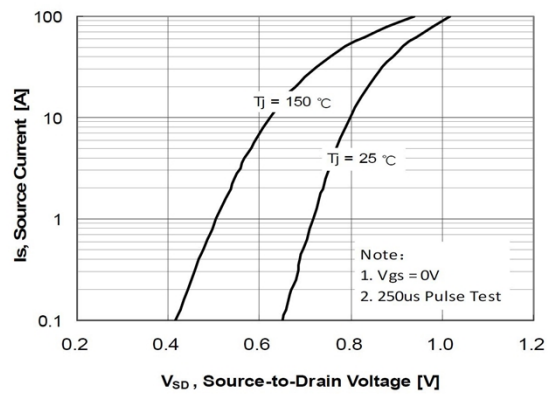
Output Characteristics



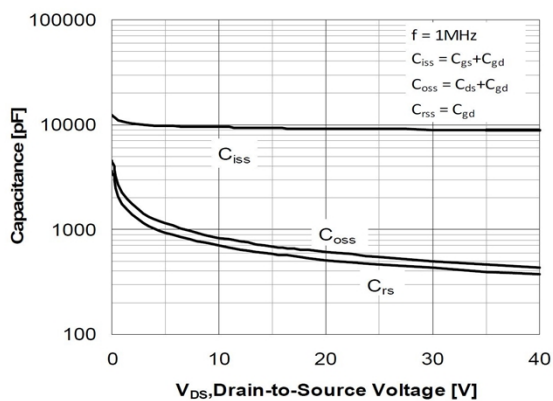
Transfer Characteristics



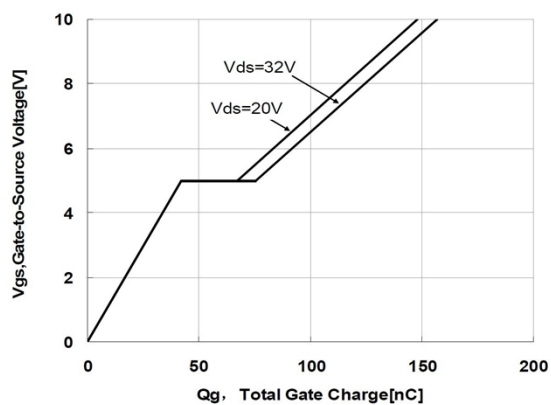
Drain-to-Source On Resistance vs Gate Voltage



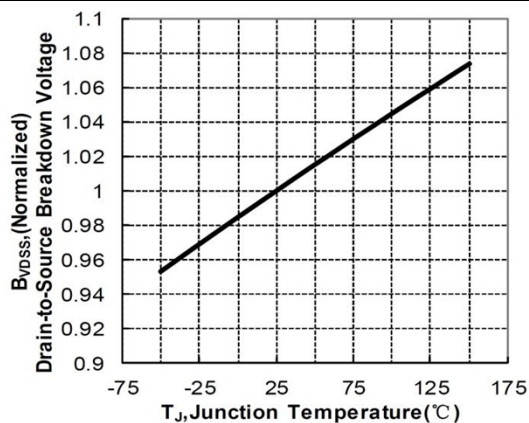
Typical Body Diode Transfer Characteristics



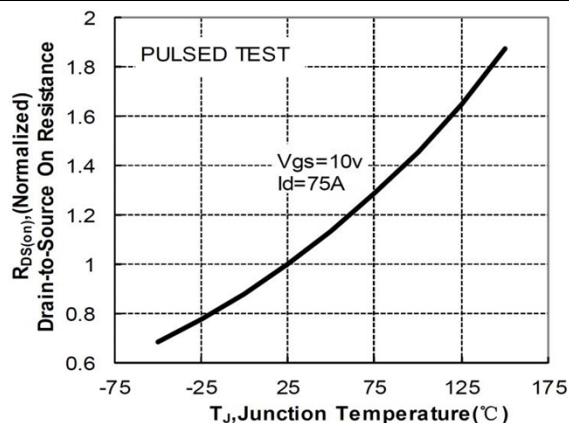
Capacitance Characteristics



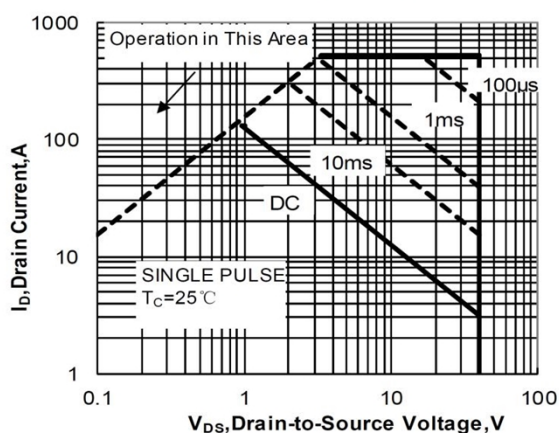
Gate Charge Characteristics



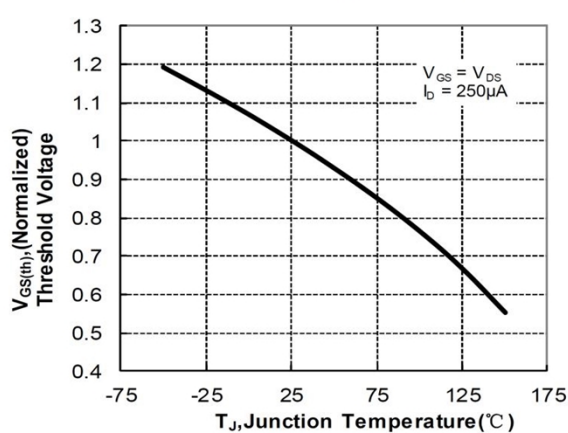
Normalized Breakdown Voltage vs Junction Temperature



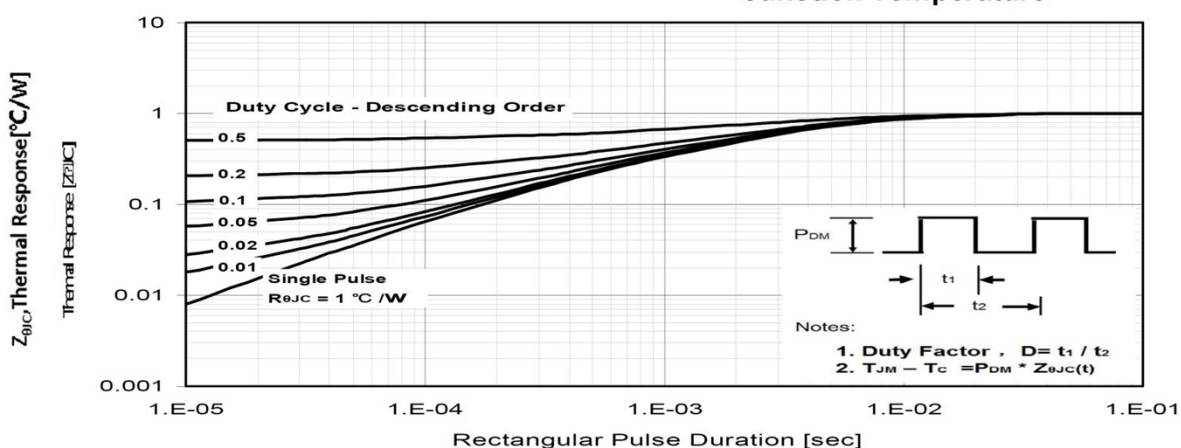
Normalized On Resistance vs Junction Temperature



Maximum Safe Operating

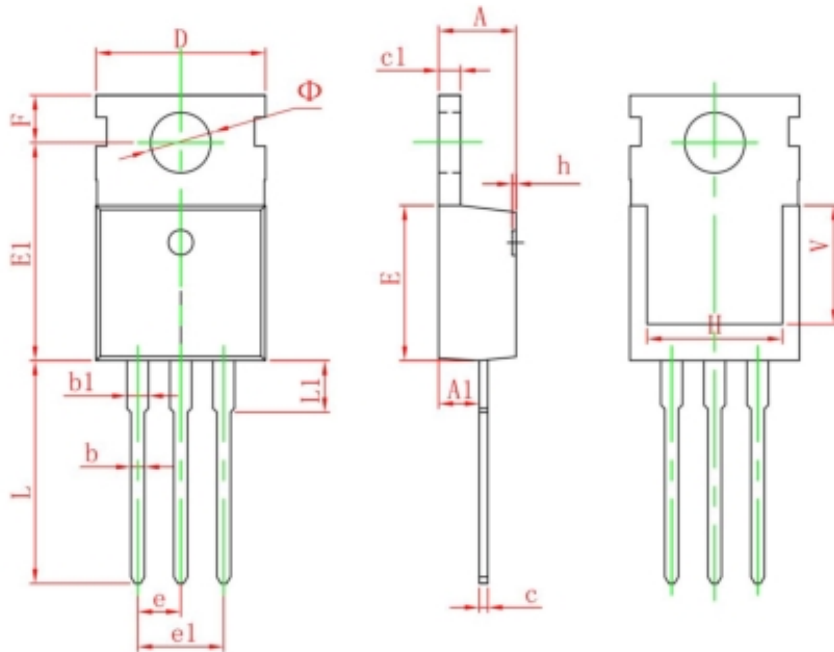


Normalized Threshold Voltage vs Junction Temperature



Maximum Effective Transient Thermal Impedance, Junction-to-Case

## 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