



TO-220-3L Plastic-Encapsulate MOSFETS

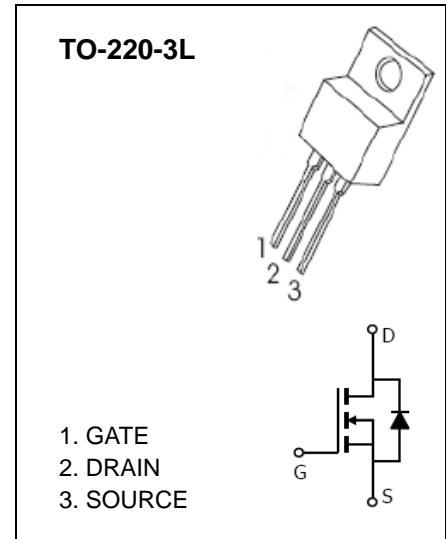
P10N65 N-Channel Power MOSFET

GENERAL DESCRIPTION

This advanced high voltage MOSFET is designed to stand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

FEATURE

- High Current Rating
- Low Gate Charge
- Lower $R_{DS(on)}$
- Low Reverse Transfer Capacitance
- Fast Switching Capability
- Tighter V_{SD} Specifications
- Avalanche Energy Specified



Maximum ratings ($T_a=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	± 30	
Continuous Drain Current	I_D	10	A
Pulsed Drain Current(note1)	I_{DM}	38	
Single Pulsed Avalanche Energy (note2)	E_{AS}	500	mJ
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	$^{\circ}\text{C}/\text{W}$
Junction Temperature	T_J	150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 ~+150	
Maximum lead temperature for soldering purposes , 1/8"from case for 5 seconds	T_L	260	

Electrical characteristics (T_a=25°C unless otherwise noted)

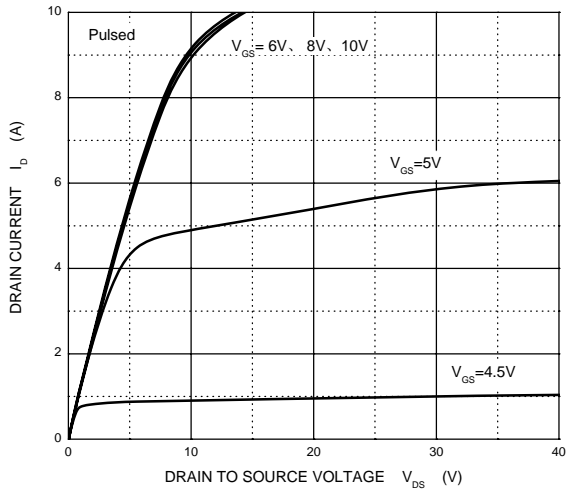
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Off characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	650			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =600V, V _{GS} =0V			1	μA
Gate-body leakage curren (note3)	I _{GSS}	V _{DS} =0V, V _{GS} = ±30V			±100	nA
On characteristics (note3)						
Gate-threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2.0		4.0	V
Static drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =5A		0.7	1	Ω
Dynamic characteristics (note 4)						
Input capacitance	C _{iss}	V _{DS} =25V, V _{GS} =0V, f =1MHz		1430		pF
Output capacitance	C _{oss}			117		
Reverse transfer capacitance	C _{rss}			2.2		
Switching characteristics (note 4)						
Total gate charge	Q _g	V _{DS} =520V, V _{GS} =10V, I _D =10A		44	57	nC
Gate-source charge	Q _{gs}			6.7		
Gate-drain charge	Q _{gd}			18.5		
Turn-on delay time	t _{d(on)}	V _{DD} =325V, R _G =25Ω, I _D =10A		46		ns
Turn-on rise time	t _r			74		
Turn-off delay time	t _{d(off)}			340		
Turn-off fall time	t _f			66		
Drain-Source Diode Characteristics						
Drain-source diode forward voltage(note3)	V _{SD}	V _{GS} = 0V, I _S =10A			1.4	V
Maximum continuous drain-source diode forward current	I _S				10	A
Maximum pulsed drain-source diode forward current	I _{SM}				38	A

Notes :

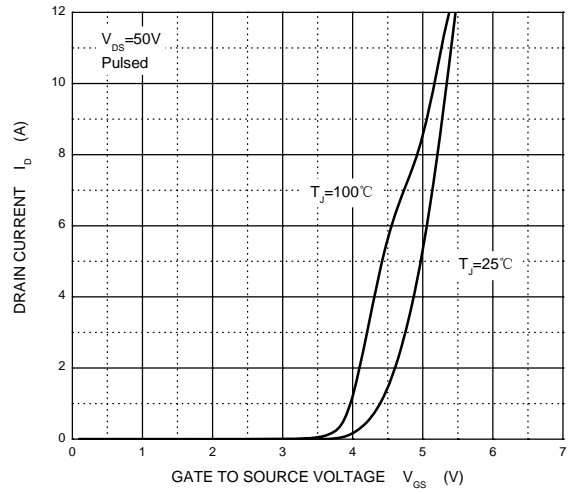
1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. L = 10mH, I_{AS} = 10A, V_{DD} = 50V, R_G = 25Ω, Starting T_J = 25°C
3. Pulse Test : Pulse width ≤300μs, duty cycle ≤2%.
4. These parameters have no way to verify.

Typical Characteristics

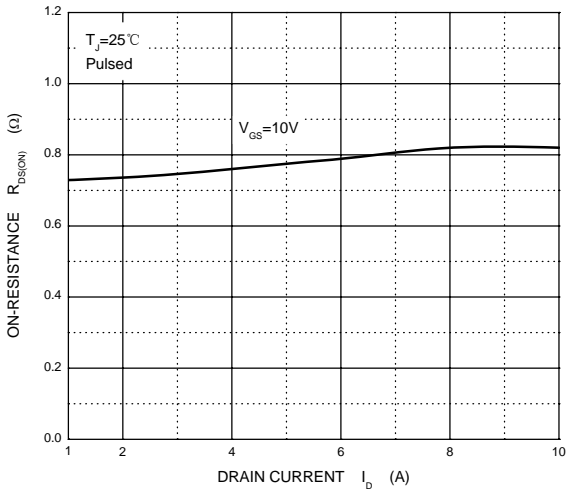
Output Characteristics



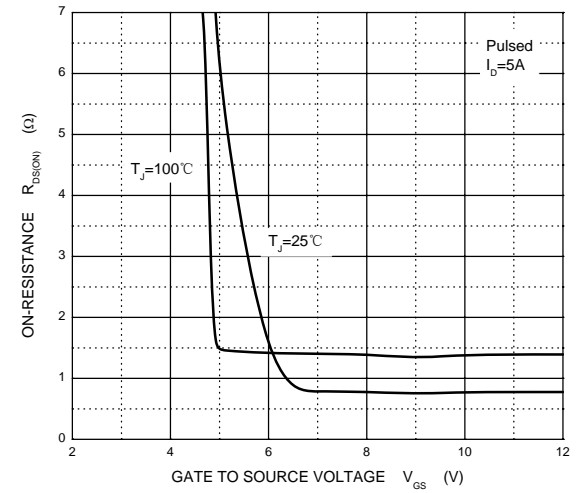
Transfer Characteristics



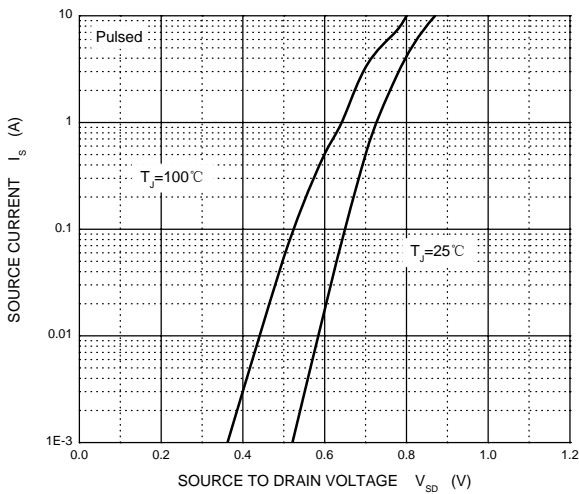
$R_{DS(ON)}$ — I_D



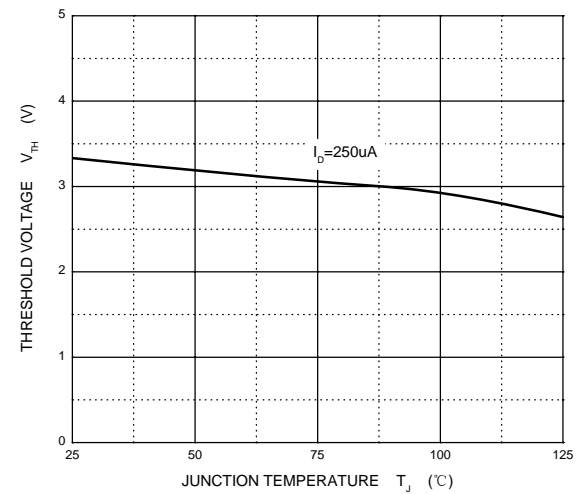
$R_{DS(ON)}$ — V_{GS}



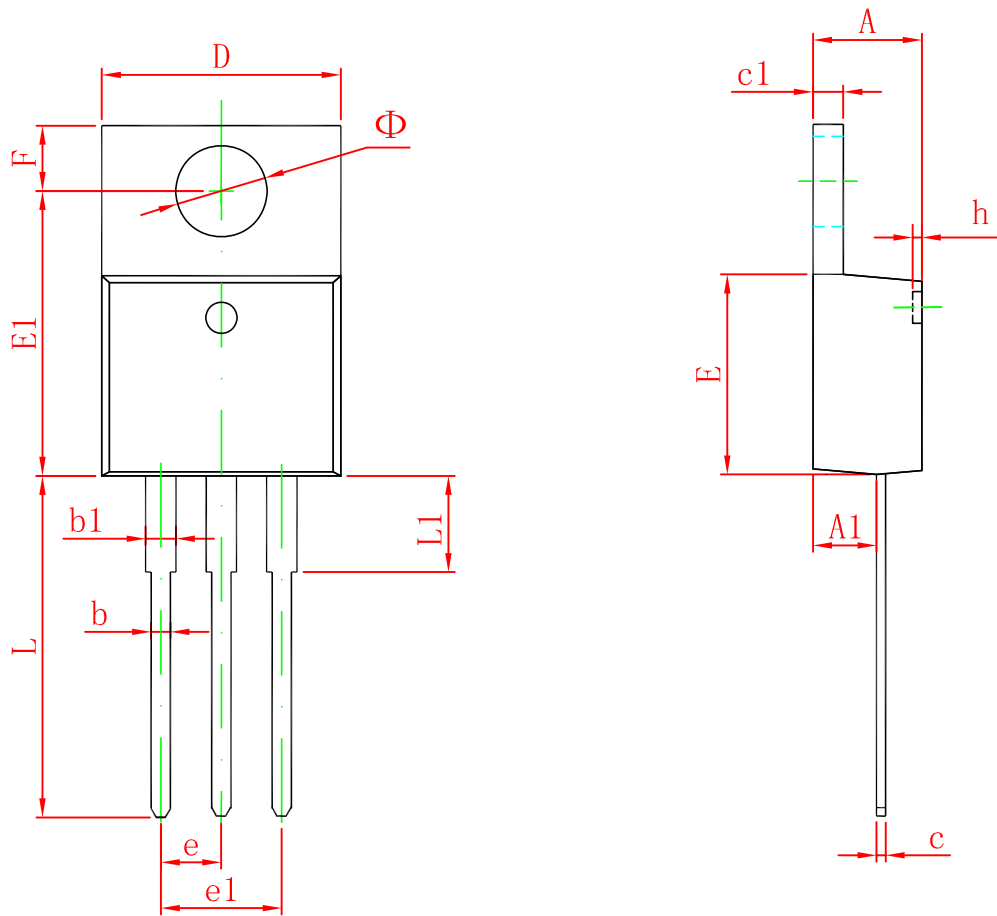
I_S — V_{SD}



Threshold Voltage



TO-220-3L Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.470	4.670	0.176	0.184
A1	2.520	2.820	0.099	0.111
b	0.710	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.310	0.530	0.012	0.021
c1	1.170	1.370	0.046	0.054
D	10.010	10.310	0.394	0.406
E	8.500	8.900	0.335	0.350
E1	12.060	12.460	0.475	0.491
e	2.540 TYP		0.100 TYP	
e1	4.980	5.180	0.196	0.204
F	2.590	2.890	0.102	0.114
h	0.000	0.300	0.000	0.012
L	13.400	13.800	0.528	0.543
L1	3.560	3.960	0.140	0.156
Φ	3.735	3.935	0.147	0.155