



#### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)TYP}$	$I_D$
120V	6.5mΩ@10V	120A

#### Feature

- Split Gate Trench Technology
- Low  $R_{DS(ON)}$
- Low Gate Charge
- Low Gate Resistance
- 100% UIS Tested

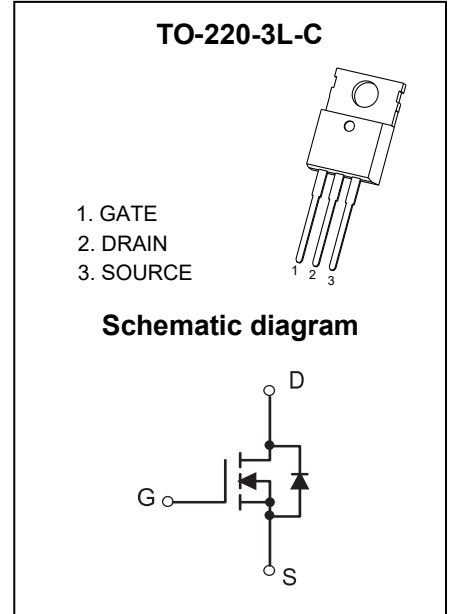
#### Application

- Power Switching Application

#### MARKING:



T050N12N = Device Code  
XX = Date Code  
Solid Dot = Green Indicator



#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	$V_{DS}$	120	V
Gate - Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current <sup>1</sup>	$T_C = 25^\circ\text{C}$	$I_D$	120
	$T_C = 100^\circ\text{C}$	$I_D$	78
Pulsed Drain Current <sup>2</sup>	$I_{DM}$	480	A
Single Pulsed Avalanche Current <sup>3</sup>	$I_{AS}$	48	A
Single Pulsed Avalanche Energy <sup>3</sup>	$E_{AS}$	576	mJ
Power Dissipation <sup>5</sup>	$T_C = 25^\circ\text{C}$	$P_D$	225
Thermal Resistance from Junction to Ambient <sup>6</sup>	$R_{\theta JA}$	52	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.55	$^\circ\text{C}/\text{W}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55~ +150	$^\circ\text{C}$

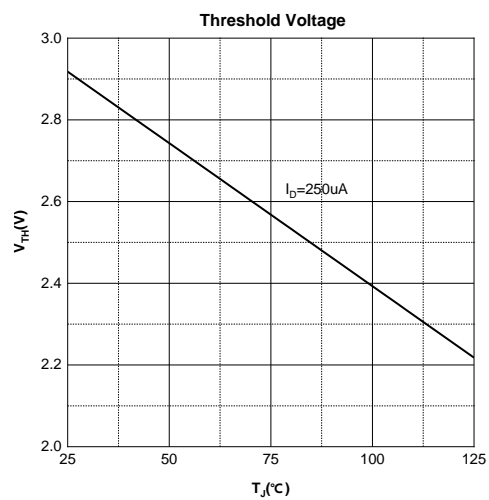
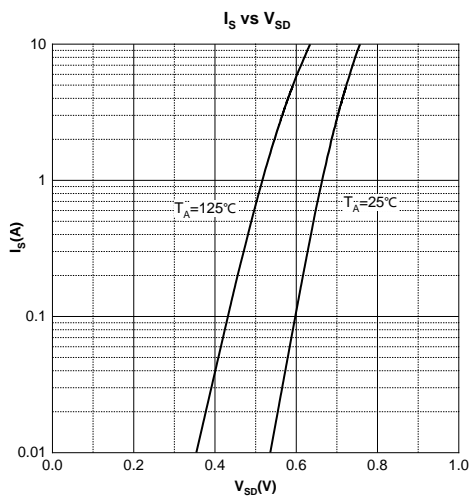
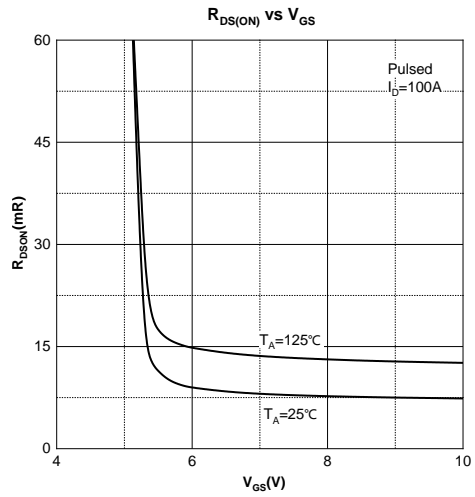
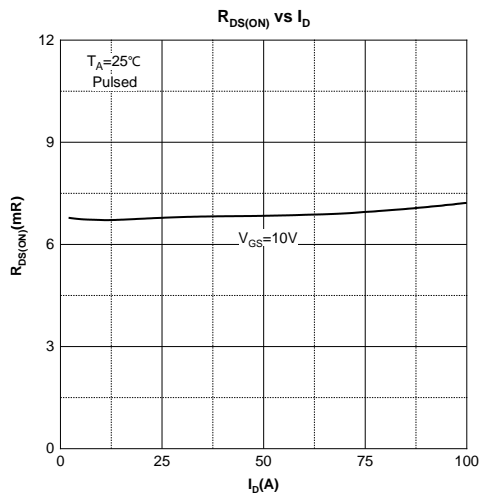
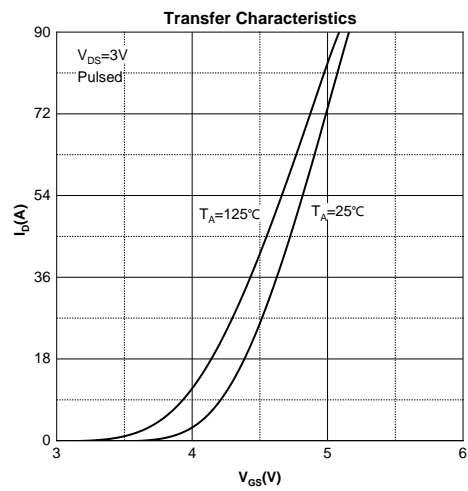
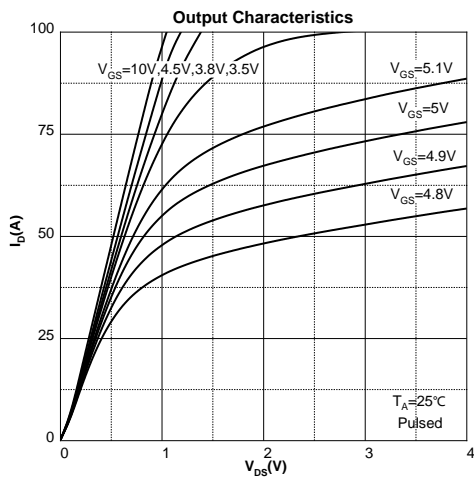
## MOSFET ELECTRICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

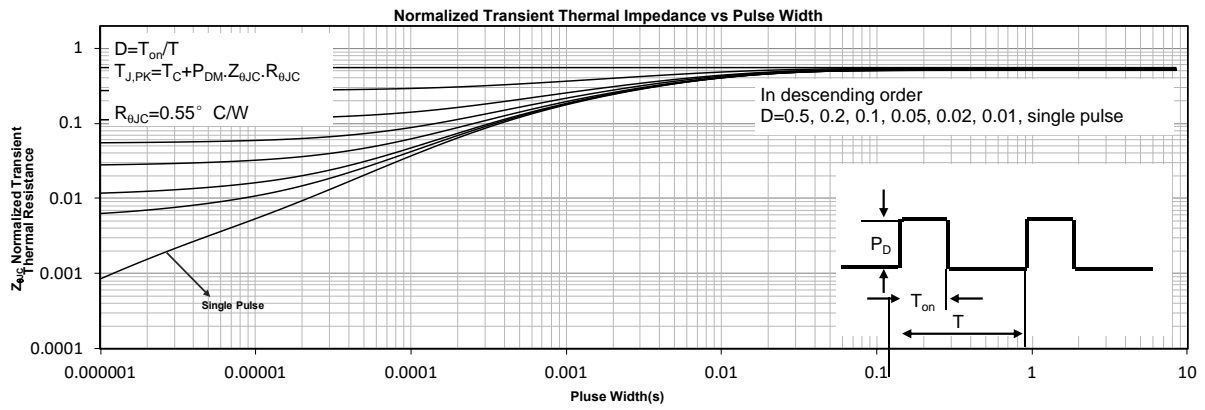
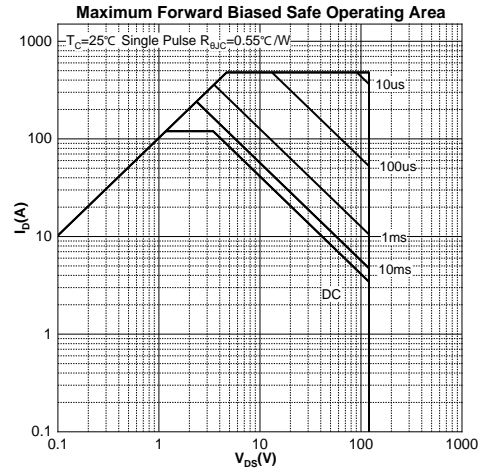
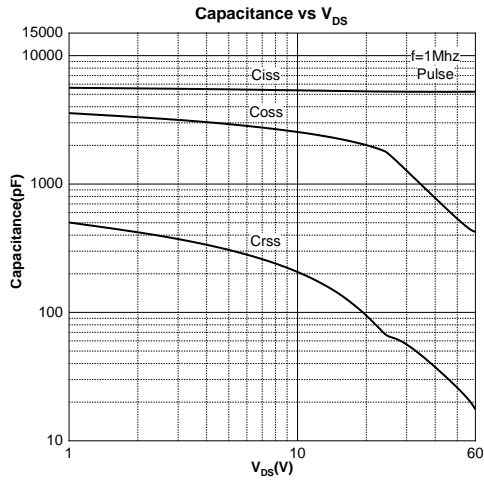
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Off Characteristics</b>						
Drain - Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	120			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 120V, V_{GS} = 0V$			1	$\mu A$
Gate - Body Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			$\pm 100$	nA
<b>On Characteristics<sup>4</sup></b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2	2.8	4	V
Drain-source On-resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 20A$		6.5	8.5	$m\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 60V, V_{GS} = 0V, f = 1MHz$		5231		pF
Output Capacitance	$C_{oss}$			426		
Reverse Transfer Capacitance	$C_{rss}$			17		
Gate Resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V, f = 1MHz$		2.4		$\Omega$
<b>Switching Characteristics</b>						
Total Gate Charge	$Q_g$	$V_{DS} = 60V, V_{GS} = 10V, I_D = 20A$		73		nC
Gate-source Charge	$Q_{gs}$			22		
Gate-drain Charge	$Q_{gd}$			13		
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 60V, V_{GS} = 10V, I_D = 20A,$ $R_G = 3\Omega$		14		ns
Turn-on Rise Time	$t_r$			8		
Turn-off Delay Time	$t_{d(off)}$			29		
Turn-off Fall Time	$t_f$			9		
<b>Source - Drain Diode Characteristics</b>						
Diode Forward Voltage <sup>4</sup>	$V_{SD}$	$V_{GS} = 0V, I_S = 20A$			1.2	V

### Notes :

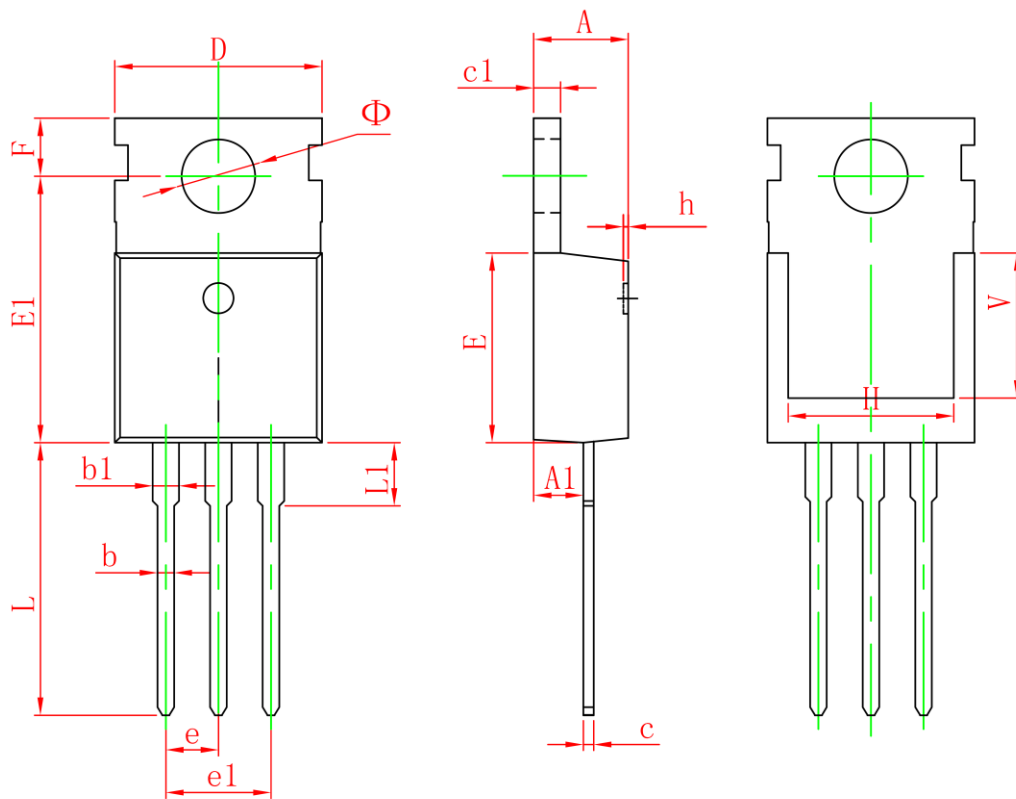
- 1.The maximum current rating is limited by package.And device mounted on a large heatsink
- 2.Pulse Test : Pulse Width  $\leq 10\mu s$ , duty cycle  $\leq 1\%$ .
- 3.EAS condition:  $V_{DD} = 50V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$  Starting  $T_J = 25^\circ\text{C}$ .
- 4.Pulse Test : Pulse Width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
- 5.The power dissipation  $P_D$  is limited by  $T_{J(MAX)} = 150^\circ\text{C}$ .And device mounted on a large heatsink
- 6.Device mounted on  $1in^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$ .

## Typical Characteristics





## 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	2.540TYP		0.100TYP	
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	6.900REF		0.272REF	
Φ	3.400	3.800	0.134	0.150