

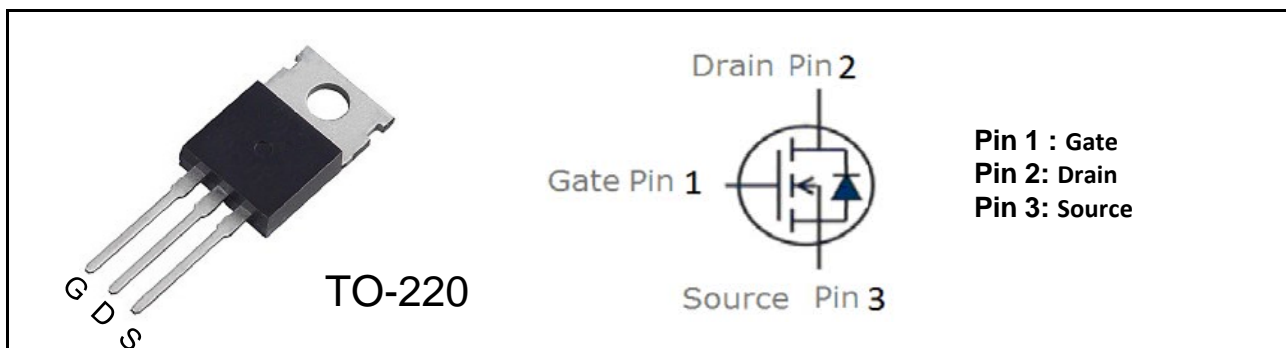
### N-Channel Enhancement-Mode MOSFET (80V, 120A)

#### PRODUCT SUMMARY

$V_{DSS}$	$I_D$	$R_{DS(on)}$ (m $\Omega$ ) Typ
100	100	9 @ $V_{GS} = 10V, I_D=40A$

#### Features

- Super high density cell design for extremely low RDS(ON)
- Exceptional on-resistance and maximum DC current capability
- 100% Avalanche test
- Lead (Pb) -free and halogen-free



#### Absolute Maximum Ratings ( $T_A=25^\circ C$ , unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 25$	V
$I_D$	Drain Current (Continuous) @ $T_A=25^\circ C$	100	A
	Drain Current (Continuous) @ $T_A=75^\circ C$	70	A
$I_{DM}$	Drain Current (Pulsed) <sup>a</sup>	360	A
$P_D$	Total Power Dissipation @ $T_A=25^\circ C$	200	W
	Total Power Dissipation @ $T_A=75^\circ C$	100	W
$E_{AS}$	Avalanche Energy, Single Pulsed, $L=0.5mH$	560	mJ
$I_S$	Maximum Diode Forward Current	100	A
$T_j, T_{stg}$	Operating Junction and Storage Temperature Range	-55 to +150	$^\circ C$
$R_{QJA}$	Thermal Resistance Junction to Ambient (PCB mounted) <sup>b</sup>	62.5	$^\circ C/W$

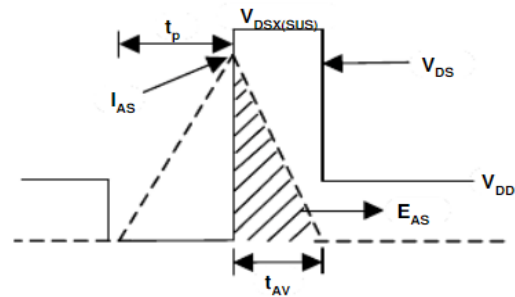
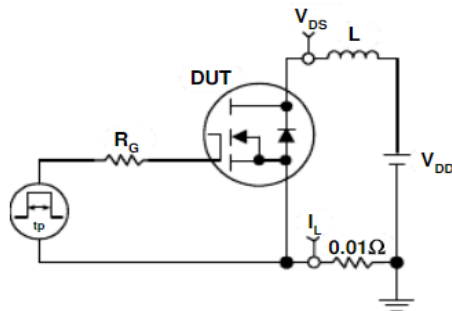
a: Repetitive Rating: Pulse width limited by the maximum junction temperature.

b: 1-in<sup>2</sup> 2oz Cu PCB board

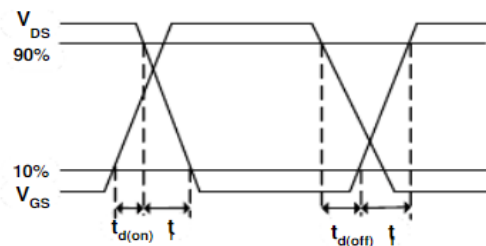
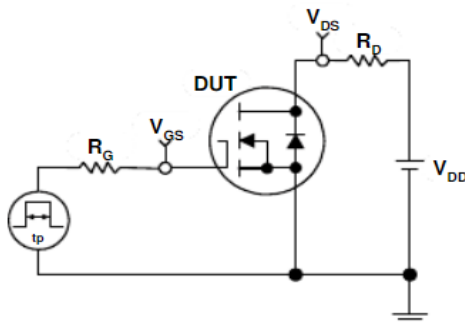
### Electrical Characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
<b>• Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=80V, V_{GS}=0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 25V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>• On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.0	4.0	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=40A$	-	9	11	m $\Omega$
<b>• Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$	-	2716	-	PF
$C_{oss}$	Output Capacitance		-	335	-	
$C_{rss}$	Reverse Transfer Capacitance		-	272	-	
<b>• Switching Characteristics</b>						
$Q_g$	Total Gate Charge	$V_{DS}=40V, I_D=30A, V_{GS}=10V$	-	76	-	nC
$Q_{gs}$	Gate-Source Charge		-	11	-	
$Q_{gd}$	Gate-Drain Charge		-	32	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=30V, R_L=15\Omega, I_D=40A, V_{GEN}=10V, R_G=6\Omega$	-	20	-	nS
$t_r$	Turn-on Rise Time		-	51	-	
$t_{d(off)}$	Turn-off Delay Time		-	66	-	
$t_f$	Turn-off Fall Time		-	43	-	
<b>• Drain-Source Diode Characteristics</b>						
$V_{SD}$	Drain-Source Diode Forward	$V_{GS}=0V, I_S=40A$	-	-	1.3	V

Note: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$



Avalanche Test Circuit and Waveforms



Avalanche Test Circuit and Waveforms

### Typical Characteristics Curves (Ta=25°C, unless otherwise note)

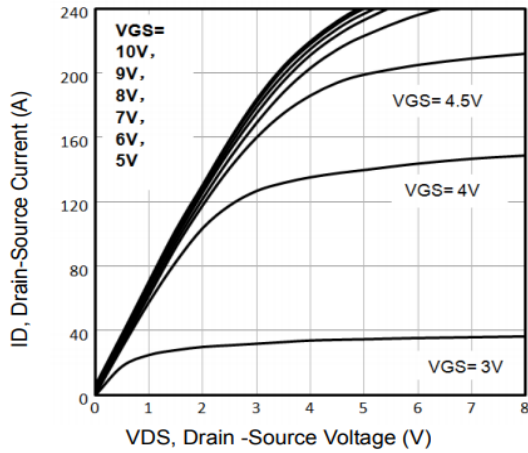


Fig1. Typical Output Characteristics

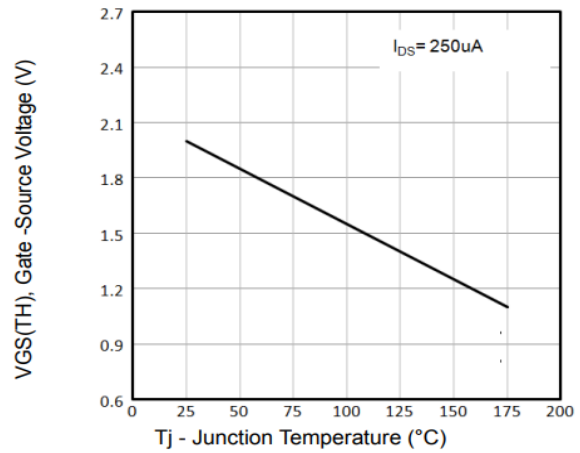


Fig2.  $V_{GS(TH)}$  Gate-Source Voltage Vs.  $T_j$

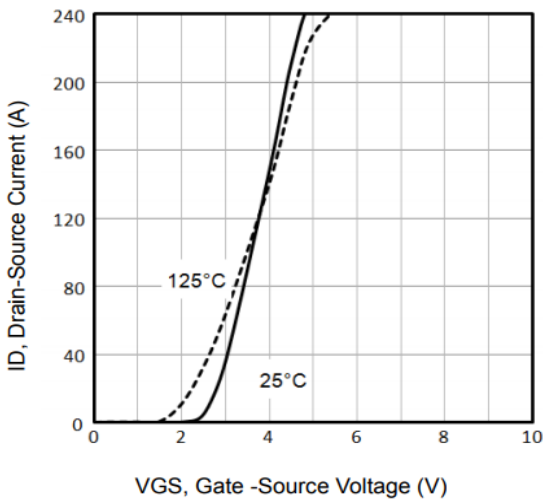


Fig3. Typical Transfer Characteristics

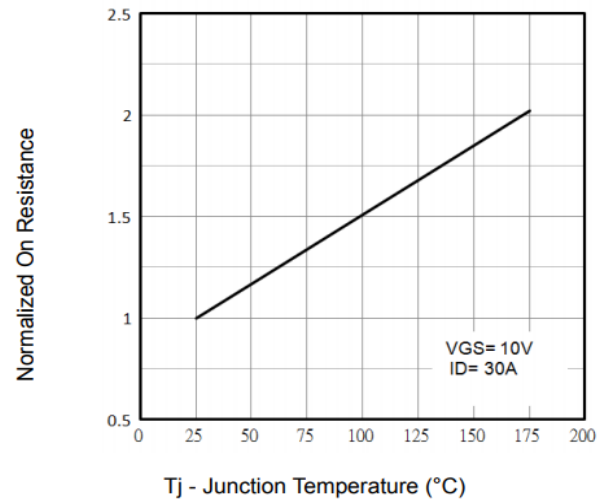


Fig4. Normalized On-Resistance Vs.  $T_j$

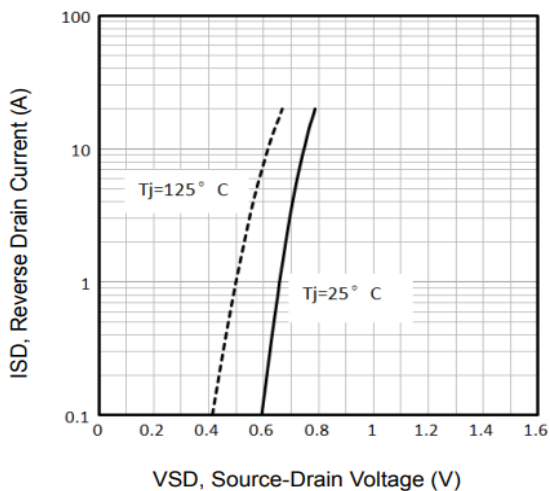


Fig5. Typical Source-Drain Diode Forward Voltage

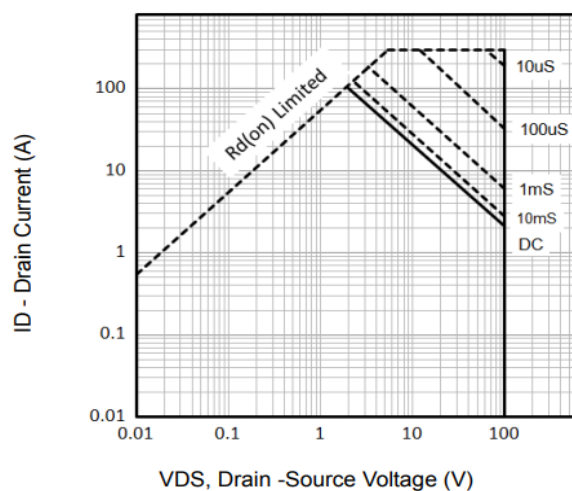
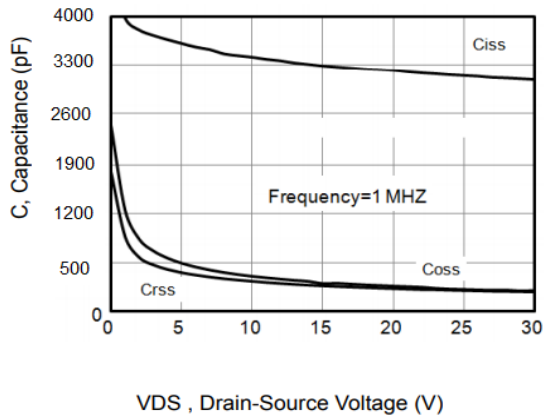
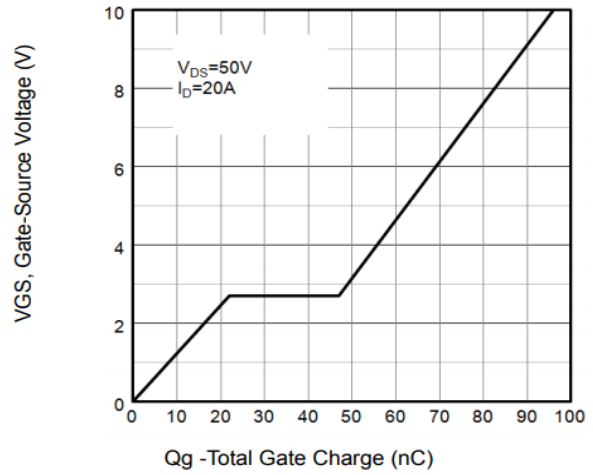


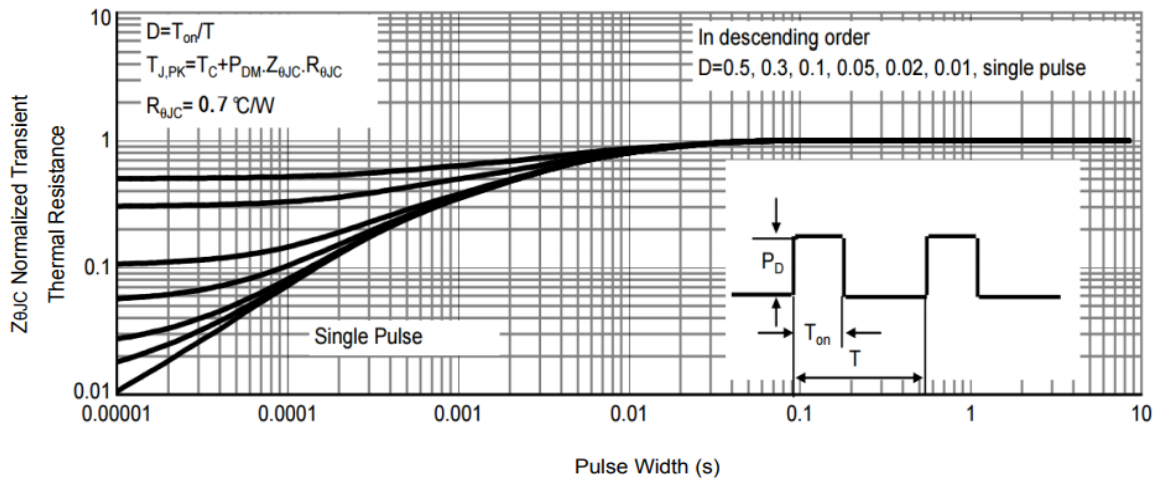
Fig6. Maximum Safe Operating Area



**Fig7.** Typical Capacitance Vs. Drain-Source Voltage

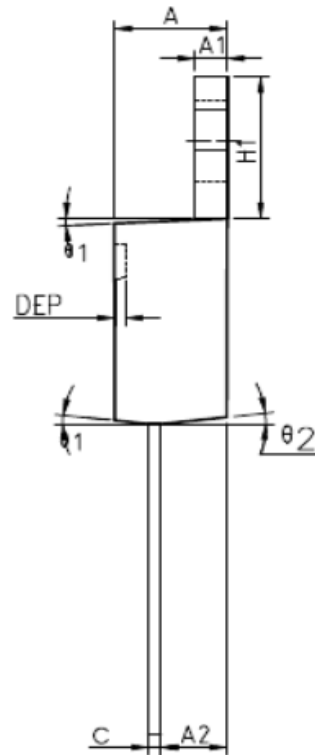
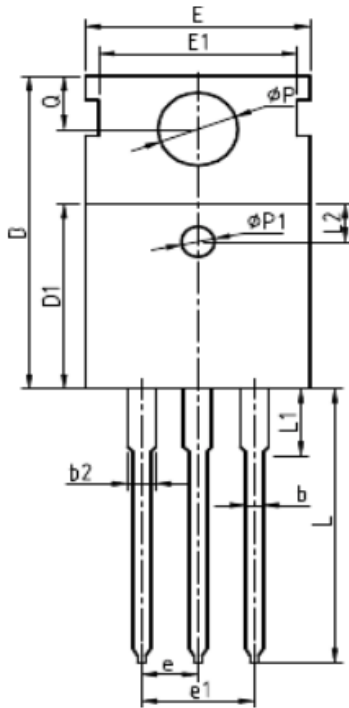


**Fig8.** Typical Gate Charge Vs. Gate-Source Voltage

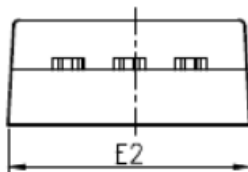


**Fig9.** Normalized Maximum Transient Thermal Impedance

### TO-220-3L PACKAGE OUTLINE DIMENSIONS



COMMON DIMENSIONS



SYMBOL	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.33	0.050	0.051	0.052
A2	2.35	2.40	2.50	0.093	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	-	8.70	-	-	0.343	-
E2	9.80	10.00	10.20	0.386	0.394	0.402
e		2.54	BSC		0.100	BSC
e1		5.08	BSC		0.200	BSC
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	-	3.10	3.30	-	0.122	0.130
L2		2.50	REF		0.098	REF
P	3.50	3.60	3.63	0.138	0.142	0.143
P1	3.50	3.60	3.63	0.138	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.113
$\theta 1$	5°	7°	9°	5°	7°	9°
$\theta 2$	1°	3°	5°	1°	3°	5°
$\theta 3$	1°	3°	5°	1°	3°	5°