

Features

- 30V, 90A
 $R_{DS(ON)} 3.88m\Omega @ V_{GS} = 10V$ (Typ)
- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquired

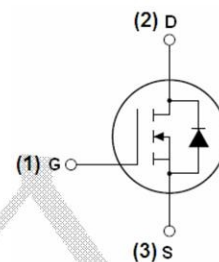
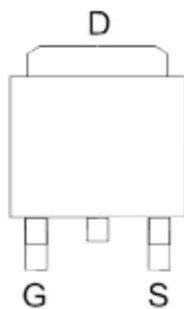
Application

- Load Switch
- PWM Application
- Power management

Package and Pin Configuration

(TO-252-3L)

Top View



Marking:



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_C = 25^\circ\text{C}$	90
		$T_C = 100^\circ\text{C}$	60
I_{DM}	Pulsed Drain Current ^{note1}	180	A
EAS	Single Pulsed Avalanche Energy ^{note2}	225	mJ
P_D	Power Dissipation	$T_C = 25^\circ\text{C}$	181
$R_{\theta JC}$	Thermal Resistance, Junction to Case	0.83	$^\circ\text{C}/\text{W}$
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V,$	-	-	1.0	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.8	1.4	2.0	V
$R_{DS(on)}$	Static Drain-Source on-Resistance	$V_{GS}=10V, I_D=10A$	-	3.88	5.0	m Ω
$R_{DS(on)}$	Static Drain-Source on-Resistance	$V_{GS}=4.5V, I_D=8A$	-	6.3	7.5	m Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	$V_{DS}=20V, V_{GS}=0V,$ $f=1.0\text{MHz}$	-	5672	-	pF
C_{oss}	Output Capacitance		-	392	-	pF
C_{rss}	Reverse Transfer Capacitance		-	352	-	pF
Q_g	Total Gate Charge	$V_{DS}=30V, I_D=30A,$ $V_{GS}=10V$	-	103	-	nC
Q_{gs}	Gate-Source Charge		-	15	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	32	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	$V_{DS}=30V, I_D=30A,$ $R_G=1.8\Omega, V_{GS}=10V$	-	12	-	ns
t_r	Turn-on Rise Time		-	8	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	49	-	ns
t_f	Turn-off Fall Time		-	15	-	ns
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	90	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	180	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=5A$	-	0.78	1.0	V
t_{rr}	Body Diode Reverse Recovery Time	$I_F=30A,$ $dI/dt=100A/\mu s$	-	27	-	ns
Q_{rr}	Body Diode Reverse Recovery Charge		-	48	-	nC

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition : $T_J=25^\circ\text{C}, V_{DD}=30V, V_G=10V, L=0.5\text{mH}, R_G=25\Omega, I_{AS}=30A$
 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Electrical and Thermal Characteristic Curves

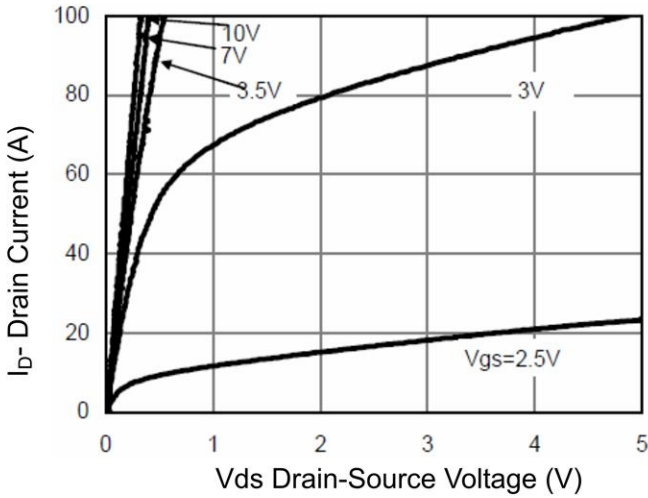


Figure 1 Output Characteristics

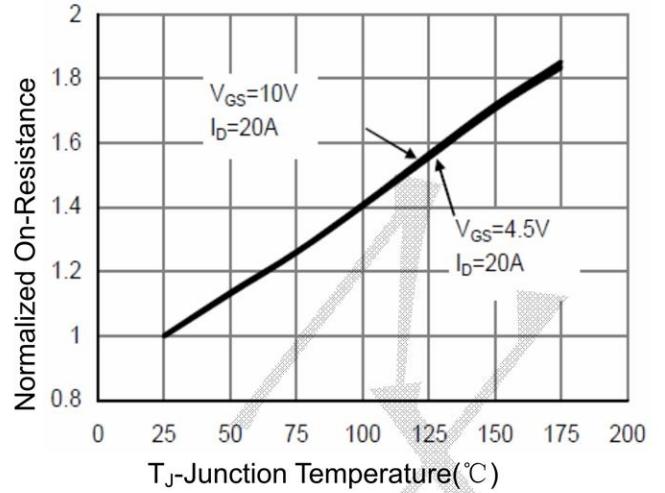


Figure 4 Rdson-Junction Temperature

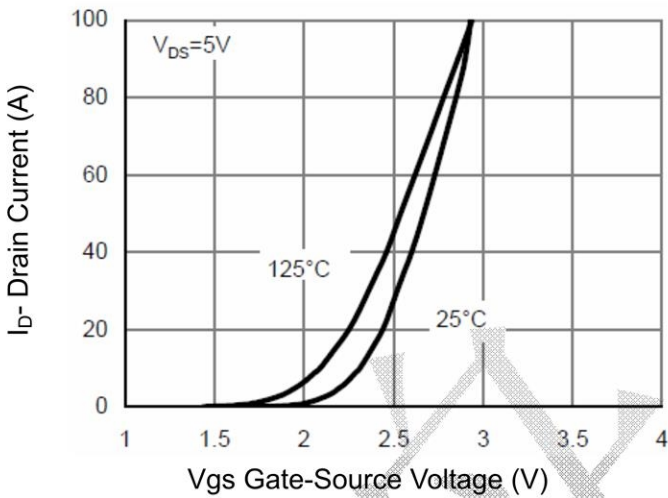


Figure 2 Transfer Characteristics

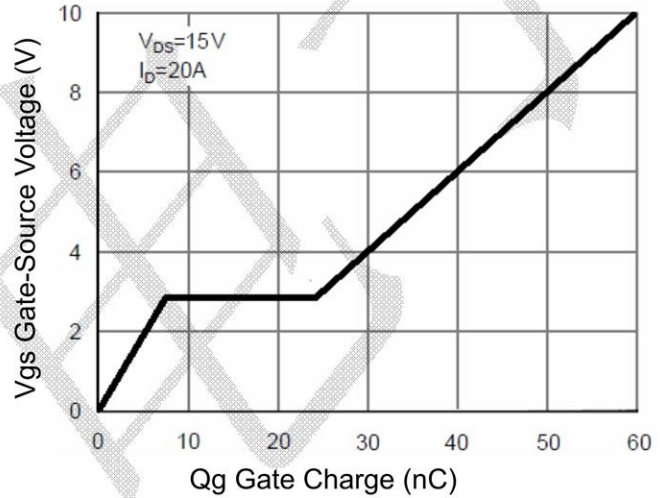


Figure 5 Gate Charge

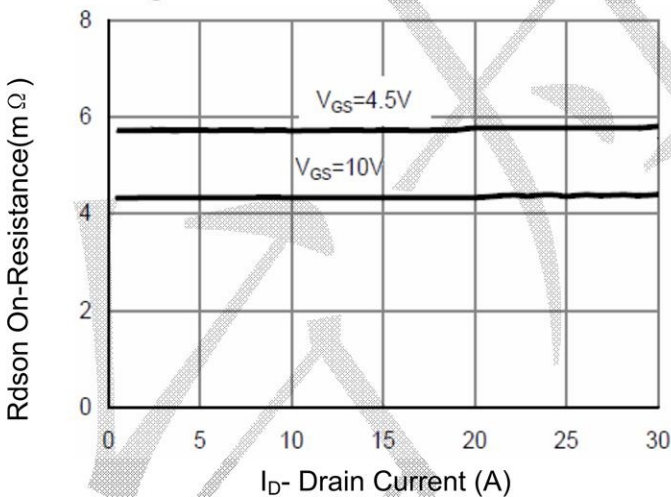


Figure 3 Rdson- Drain Current

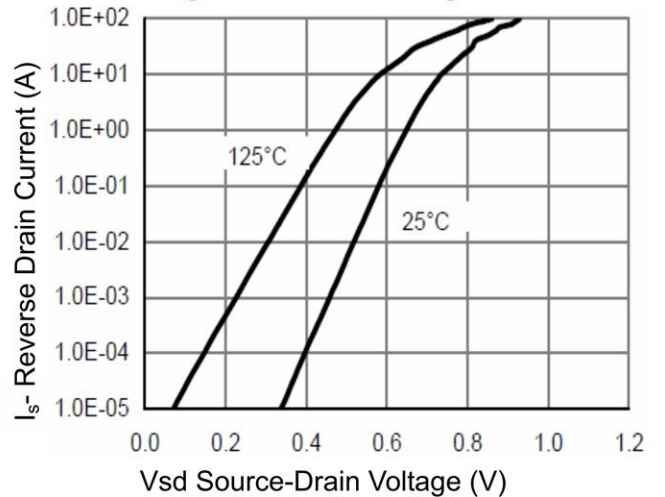


Figure 6 Source- Drain Diode Forward

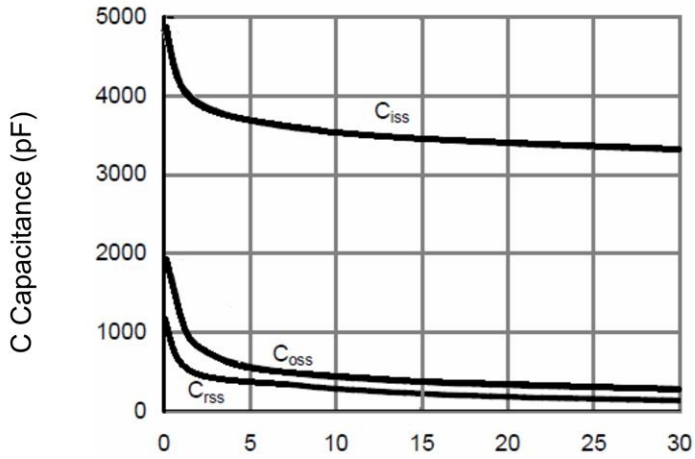


Figure 7 Capacitance vs Vds

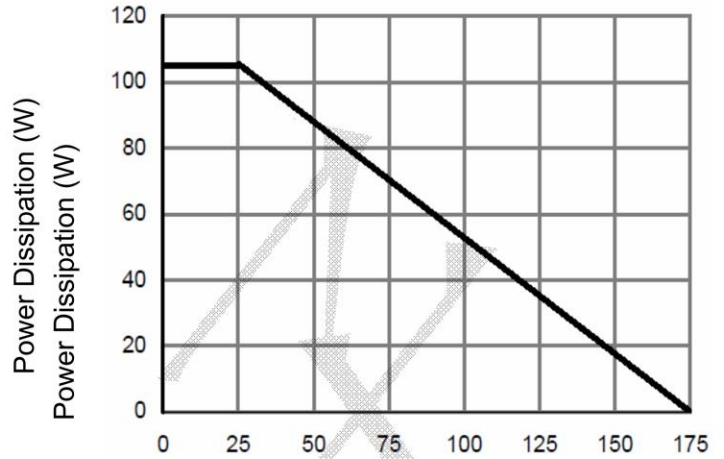


Figure 9 Power De-rating

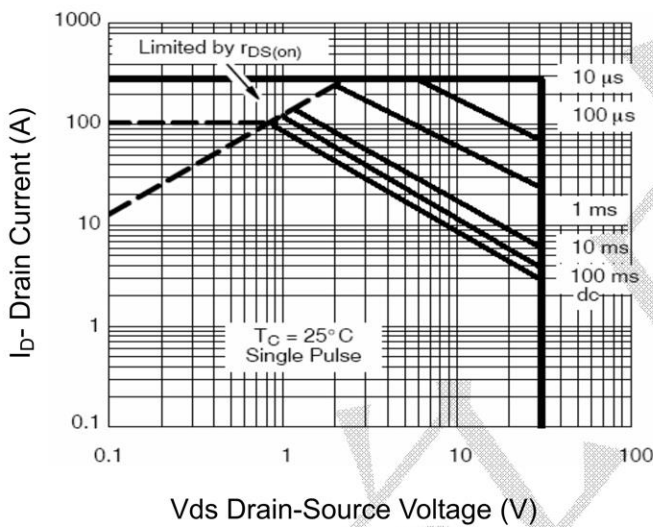


Figure 8 Safe Operation Area

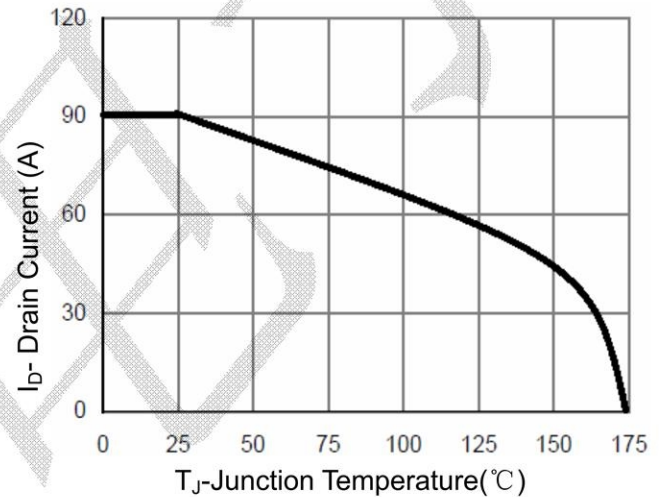


Figure 10 ID Current Derating

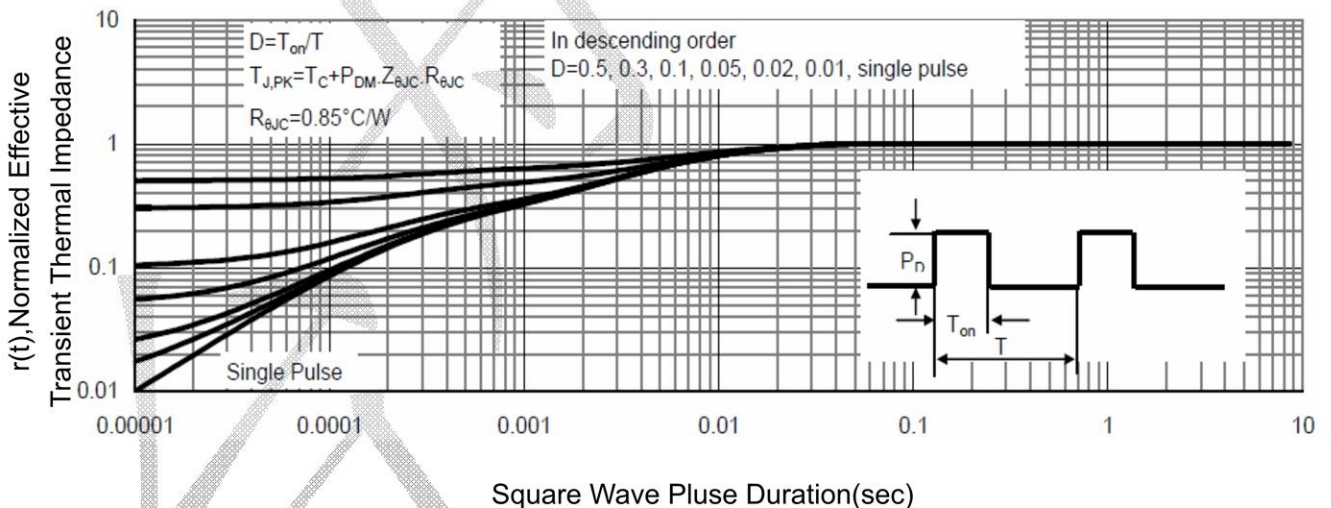


Figure 11 Normalized Maximum Transient Thermal Impedance



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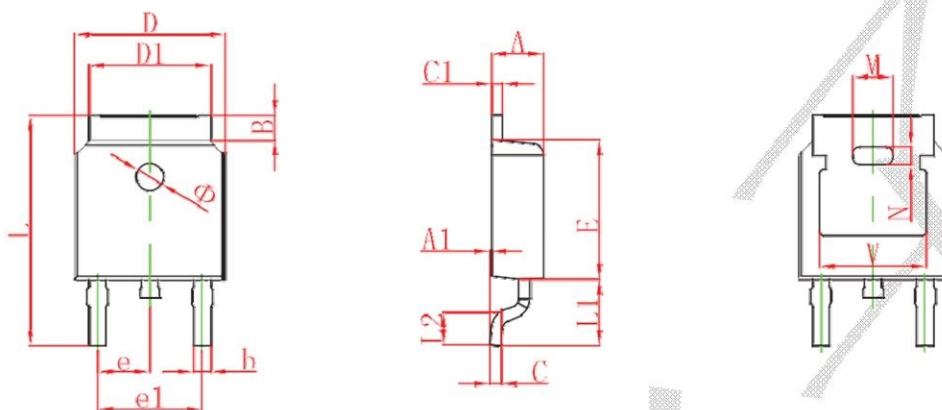
—台丹电子—

TPM3090NK3-6

N-Channel Enhancement Mode Power MOSFET

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TO252 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.380	0.087	0.094
A1	0.000	0.100	0.000	0.004
B	0.800	1.400	0.031	0.055
b	0.710	0.810	0.028	0.032
c	0.460	0.560	0.018	0.022
c1	0.460	0.560	0.018	0.022
D	6.500	6.700	0.256	0.264
D1	5.130	5.460	0.202	0.215
E	6.000	6.200	0.236	0.244
e	2.286 TYP.		0.090 TYP.	
e1	4.327	4.727	0.170	0.186
M	1.778 REF.		0.070 REF.	
N	0.762 REF.		0.018 REF.	
L	9.800	10.400	0.386	0.409
L1	2.9 REF.		0.114 REF.	
L2	1.400	1.700	0.055	0.067
V	4.830 REF.		0.190 REF.	
Y	1.100	1.300	0.043	0.051

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