

TM90N06D

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

Applications

- Load switch
- PWM

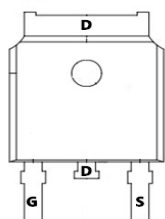
General Features

$V_{DS} = 60V$ $I_D = 90A$

$R_{DS(ON)} = 5.3 m\Omega (typ.) @ V_{GS} = 10V$

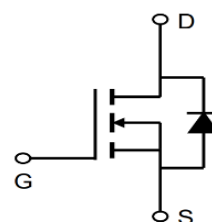
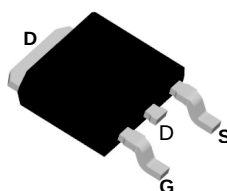
100% UIS Tested

100% R_g Tested



Marking: 90N06

D:TO-252-3L



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

Symbol	Parameter		Max.	Units
V_{DSS}	Drain-Source Voltage		60	V
V_{GSS}	Gate-Source Voltage		± 25	V
I_D	Continuous Drain Current	$T_C = 25^\circ C$	90	A
		$T_C = 100^\circ C$	52	A
I_{DM}	Pulsed Drain Current ^{note1}		220	A
EAS	Single Pulsed Avalanche Energy ^{note2}		169	mJ
P_D	Power Dissipation	$T_C = 25^\circ C$	108	W
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.4	$^\circ C/W$
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to +175	$^\circ C$

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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 =250μA	60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} =±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =30A	-	5.3	7.5	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1.0MHz	-	3136	-	pF
C _{oss}	Output Capacitance		-	286	-	pF
C _{rss}	Reverse Transfer Capacitance		-	257	-	pF
Q _g	Total Gate Charge	V _{DS} =30V, I _D =30A, V _{GS} =10V	-	90	-	nC
Q _{gs}	Gate-Source Charge		-	9	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	18	-	nC
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DS} =30V, I _D =30A, R _G =1.8Ω, V _{GS} =10V	-	9	-	ns
t _r	Turn-on Rise Time		-	7	-	ns
t _{d(off)}	Turn-off Delay Time		-	40	-	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		-	-	320	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =30A	-	-	1.2	V
t _{rr}	Body Diode Reverse Recovery Time	I _F =30A, dI/dt=100A/μs	-	33	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	46	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition : $T_J=25^{\circ}\text{C}$, $V_{DD}=30V$, $V_G=10V$, $L=0.5mH$, $R_g=25\Omega$, $I_{AS}=26A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



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Typical Performance Characteristics

Figure 1: Output Characteristics

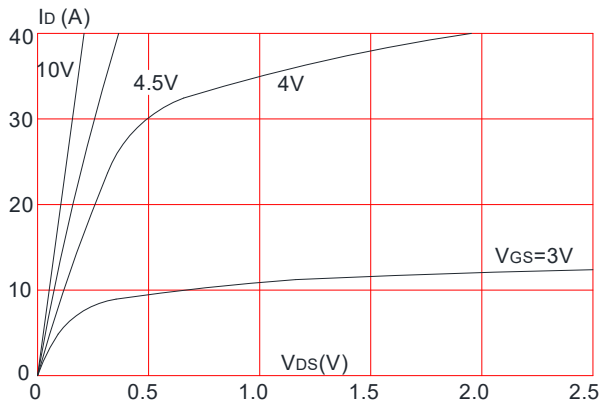


Figure 2: Typical Transfer Characteristics

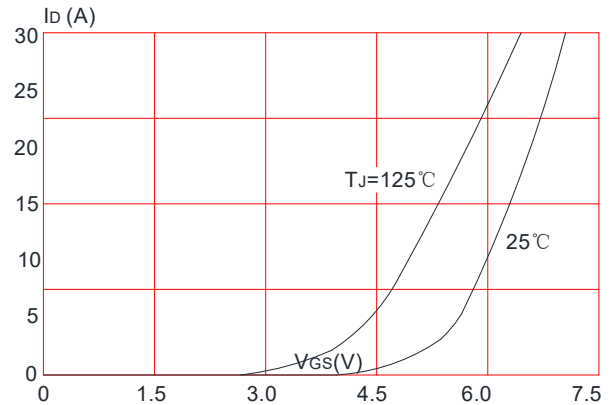


Figure 3: On-resistance vs. Drain Current

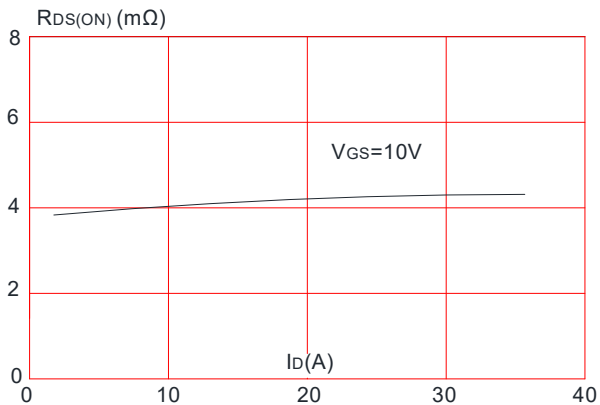


Figure 4: Body Diode Characteristics

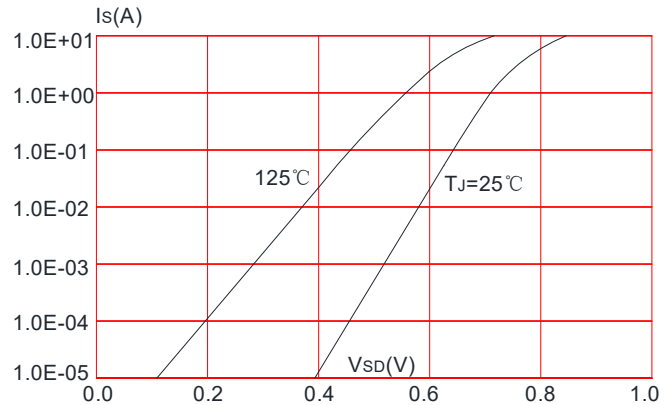


Figure 5: Gate Charge Characteristics

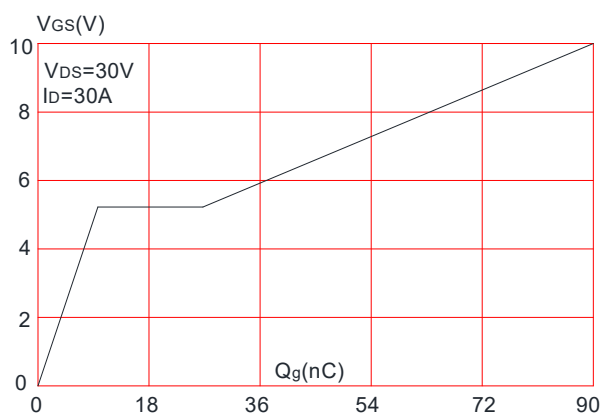
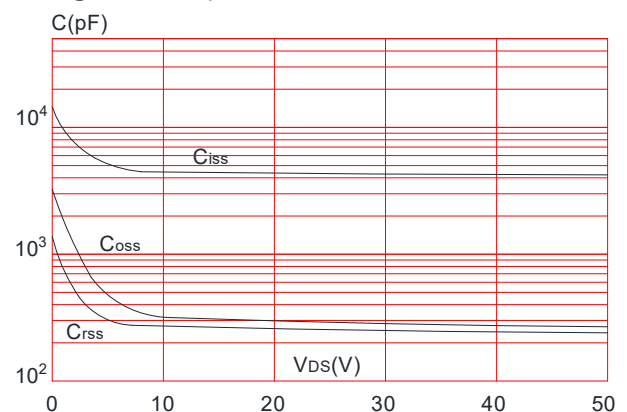


Figure 6: Capacitance Characteristics



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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

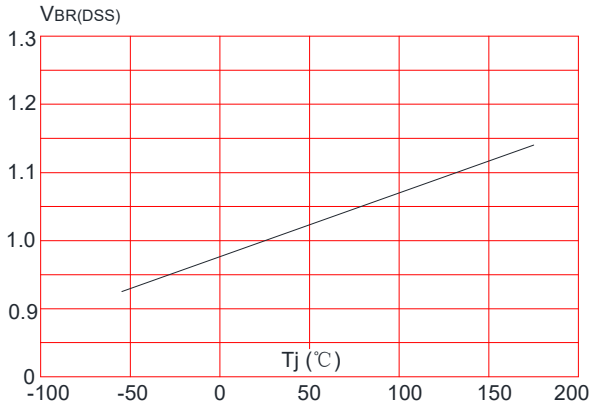


Figure 8: Normalized on Resistance vs. Junction Temperature

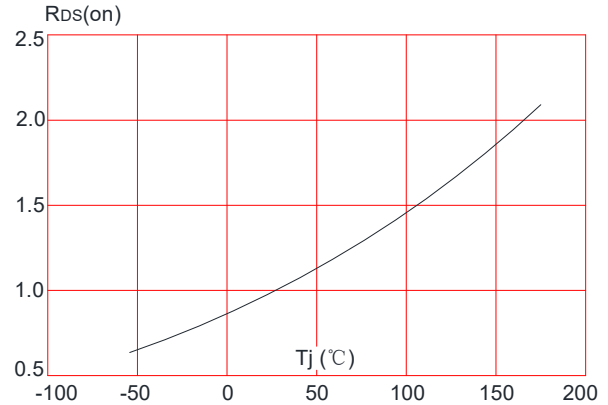


Figure 9: Maximum Safe Operating Area

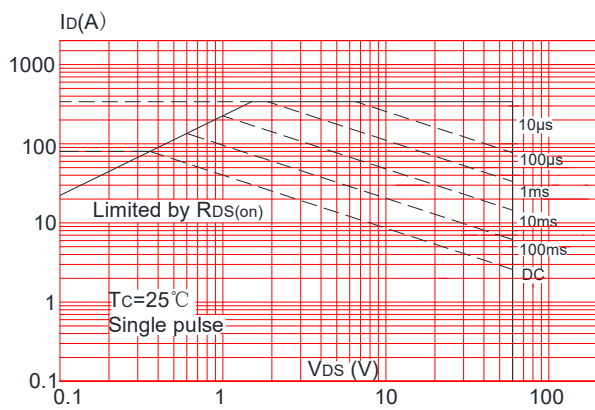


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

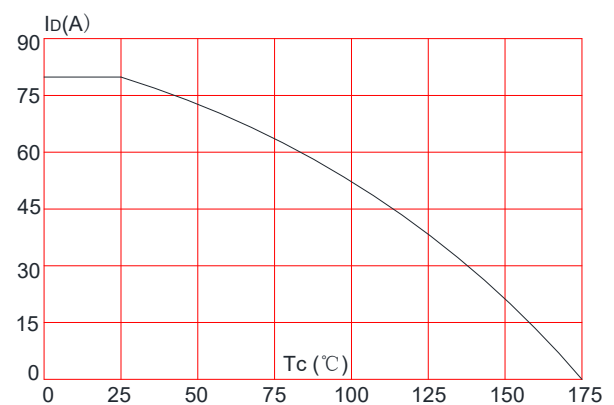
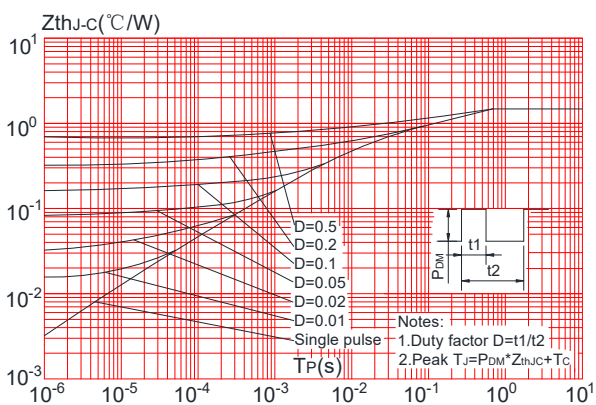
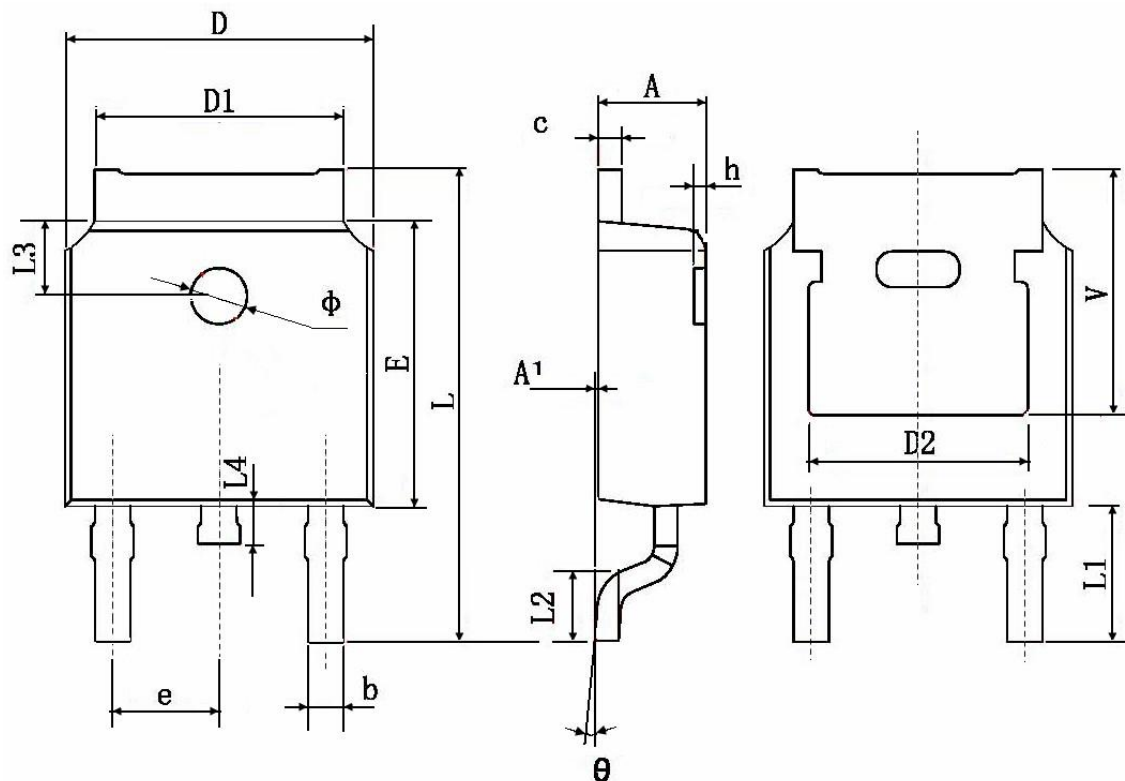


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Package Information : TO-252-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	