

Features

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- Halogen free package
- JEDEC Qualification

N-channel MOSFET		
BV_{DSS}	I_D	$R_{DS(on)}$
900V	2.5A	<5.1Ω



Device	Package	Marking	Remark
TMD3N90/ TMU3N90	D-PAK/I-PAK	TMD3N90 / TMU3N90	RoHS
TMD3N90G / TMU3N90G	D-PAK/I-PAK	TMD3N90G / TMU3N90G	Halogen Free

Absolute Maximum Ratings

Parameter	Symbol	TMD3N90(G)/TMU3N90(G)	Unit
Drain-Source Voltage	V_{DSS}	900	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current $T_C = 25\text{ °C}$	I_D	2.5	A
		1.6	A
Pulsed Drain Current (Note 1)	I_{DM}	10	A
Single Pulse Avalanche Energy (Note 2)	E_{AS}	16.6	mJ
Repetitive Avalanche Current (Note 1)	I_{AR}	2.5	A
Repetitive Avalanche Energy (Note 1)	E_{AR}	9.4	mJ
Power Dissipation $T_C = 25\text{ °C}$	P_D	94	W
		0.75	W/°C
Peak Diode Recovery dv/dt (Note 3)	dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~150	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds	T_L	300	°C

* Limited only by maximum junction temperature

Thermal Characteristics

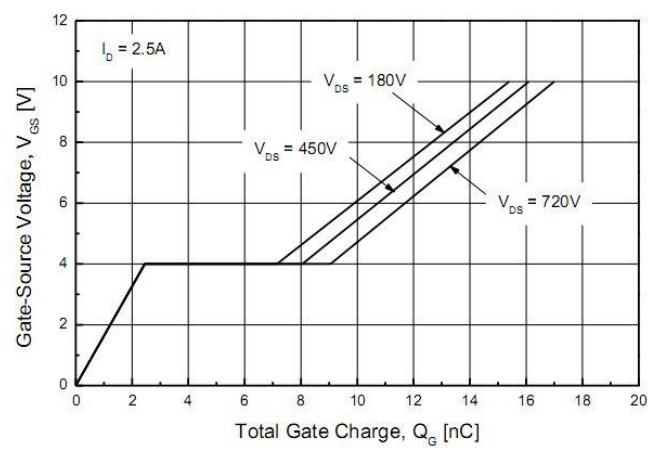
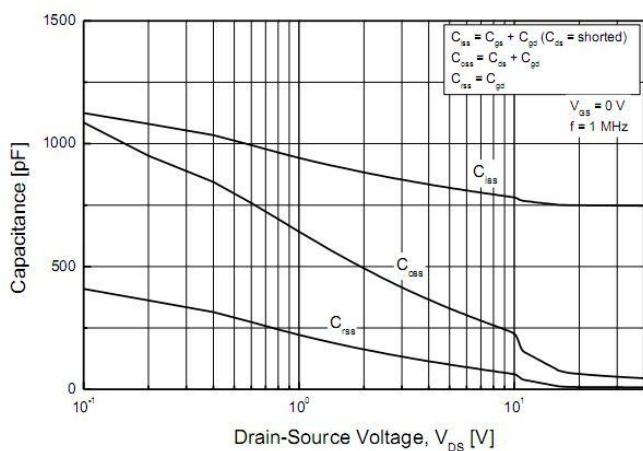
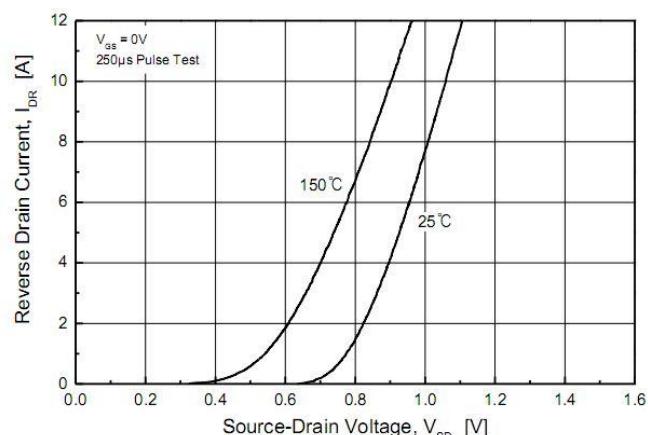
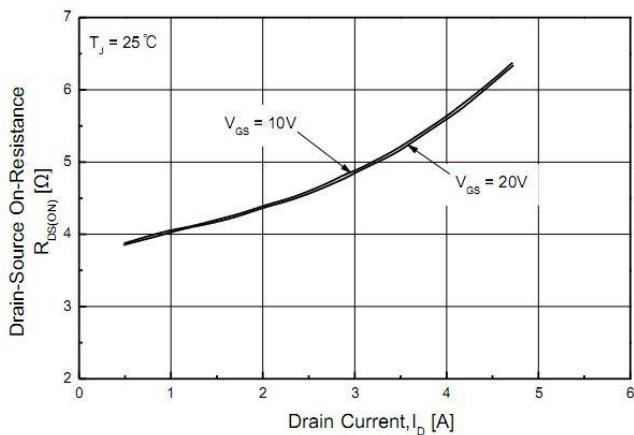
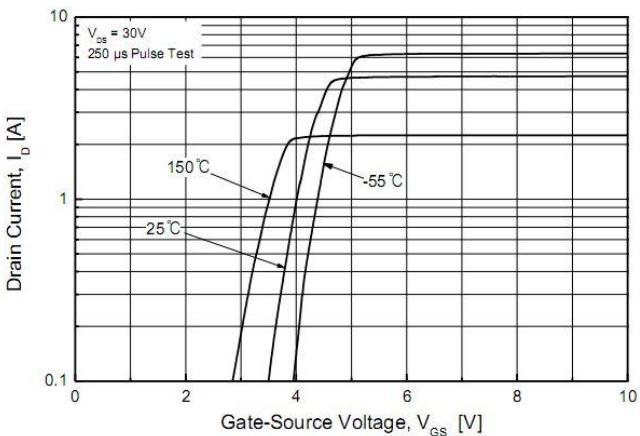
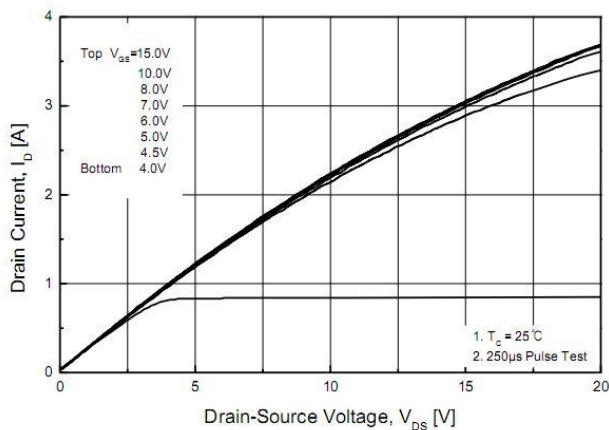
Parameter	Symbol	TMD3N90(G)/TMU3N90(G)	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	1.33	°C/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	110	°C/W

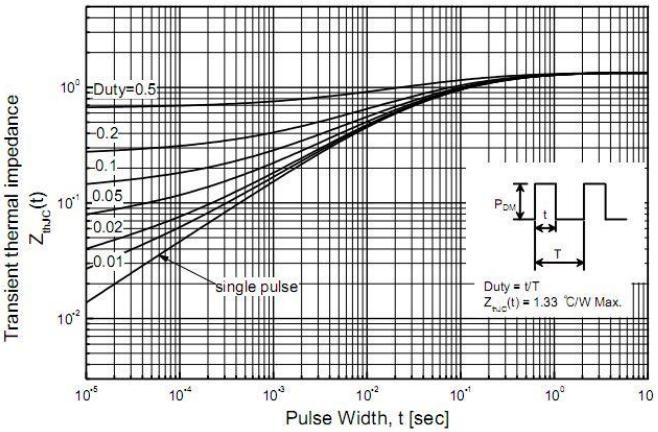
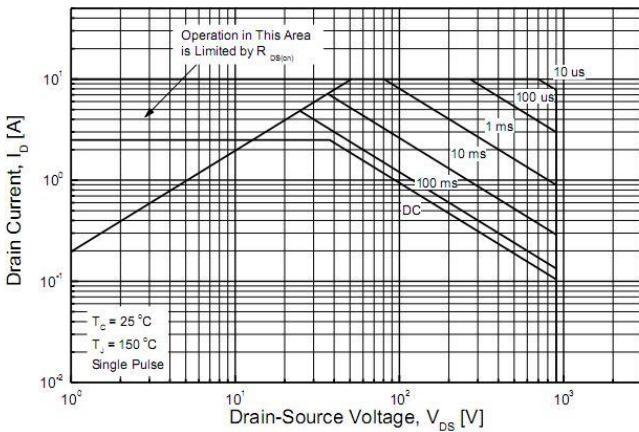
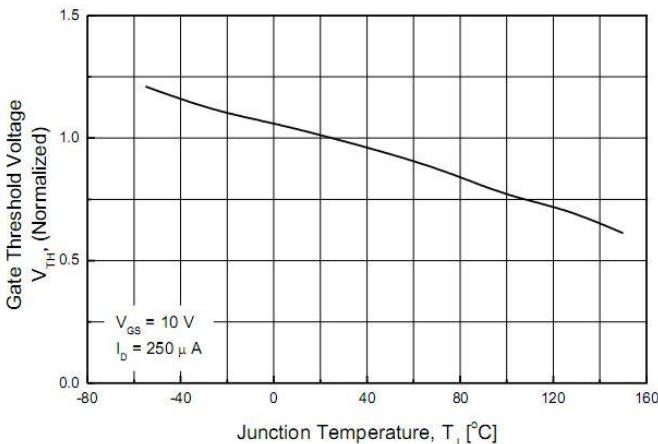
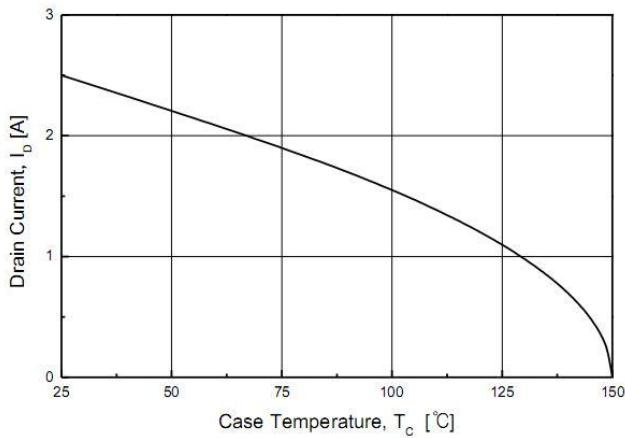
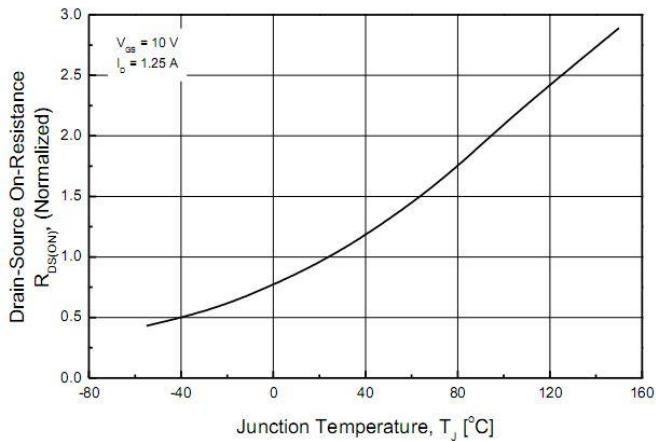
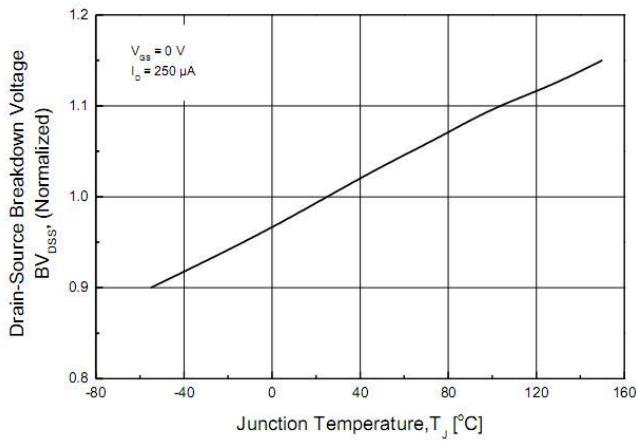
Electrical Characteristics : $T_c=25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}} = 0 \text{ V}, I_{\text{D}} = 250 \mu\text{A}$	900	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = 900 \text{ V}, V_{\text{GS}} = 0 \text{ V}$	--	--	1	μA
		$V_{\text{DS}} = 720 \text{ V}, T_c = 125^\circ\text{C}$	--	--	10	μA
Forward Gate-Source Leakage Current	I_{GSSF}	$V_{\text{GS}} = 30 \text{ V}, V_{\text{DS}} = 0 \text{ V}$	--	--	100	nA
Reverse Gate-Source Leakage Current	I_{GSSR}	$V_{\text{GS}} = -30 \text{ V}, V_{\text{DS}} = 0 \text{ V}$	--	--	-100	nA
ON						
Gate Threshold Voltage	$V_{\text{GS(th)}}$	$V_{\text{DS}} = V_{\text{GS}}, I_{\text{D}} = 250 \mu\text{A}$	2	--	4	V
Drain-Source On-Resistance	$R_{\text{DS(on)}}$	$V_{\text{GS}} = 10 \text{ V}, I_{\text{D}} = 1.25 \text{ A}$	--	4.3	5.1	Ω
Forward Transconductance ^(Note 4)	g_{FS}	$V_{\text{DS}} = 30 \text{ V}, I_{\text{D}} = 1.25 \text{ A}$	--	3	--	S
DYNAMIC						
Input Capacitance	C_{iss}	$V_{\text{DS}} = 25 \text{ V}, V_{\text{GS}} = 0 \text{ V}, f = 1.0 \text{ MHz}$	--	748	--	pF
Output Capacitance	C_{oss}		--	55	--	pF
Reverse Transfer Capacitance	C_{rss}		--	8.7	--	pF
SWITCHING						
Turn-On Delay Time ^(Note 4,5)	$t_{\text{d(on)}}$	$V_{\text{DD}} = 450 \text{ V}, I_{\text{D}} = 2.5 \text{ A}, R_{\text{G}} = 25 \Omega$	--	16	--	ns
Turn-On Rise Time ^(Note 4,5)	t_r		--	25	--	ns
Turn-Off Delay Time ^(Note 4,5)	$t_{\text{d(off)}}$		--	63	--	ns
Turn-Off Fall Time ^(Note 4,5)	t_f		--	31	--	ns
Total Gate Charge ^(Note 4,5)	Q_g	$V_{\text{DS}} = 720 \text{ V}, I_{\text{D}} = 2.5 \text{ A}, V_{\text{GS}} = 10 \text{ V}$	--	17	--	nC
Gate-Source Charge ^(Note 4,5)	Q_{gs}		--	2.4	--	nC
Gate-Drain Charge ^(Note 4,5)	Q_{gd}		--	6.6	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_s	----	--	--	2.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	----	--	--	10	A
Drain-Source Diode Forward Voltage	V_{SD}	$V_{\text{GS}} = 0 \text{ V}, I_s = 2.5 \text{ A}$	--	--	1.5	V
Reverse Recovery Time ^(Note 4)	t_{rr}	$V_{\text{GS}} = 0 \text{ V}, I_s = 2.5 \text{ A}$ $dI_F / dt = 100 \text{ A}/\mu\text{s}$	--	355	--	ns
Reverse Recovery Charge ^(Note 4)	Q_{rr}		--	1.8	--	μC

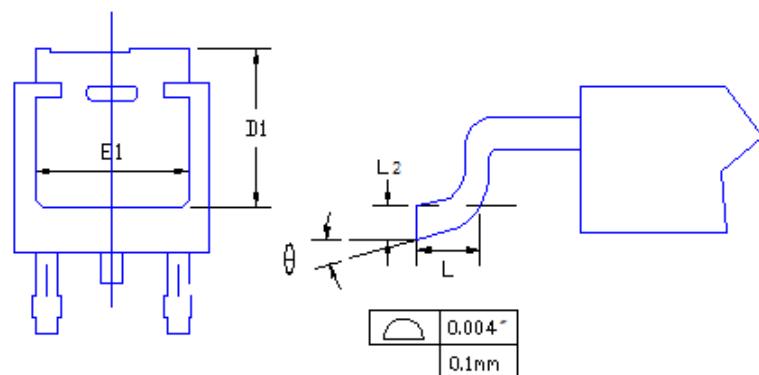
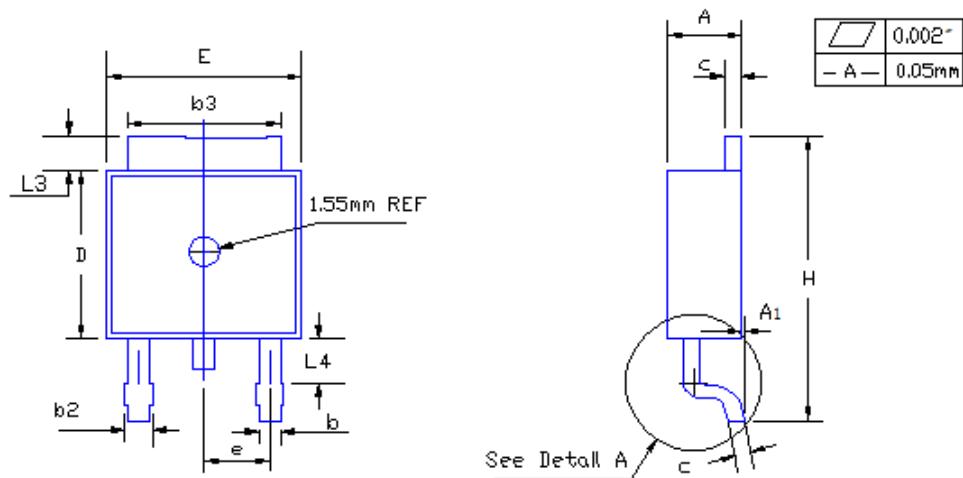
Note :

1. Repetitive rating : Pulse width limited by maximum junction temperature
2. L=5.0mH, $I_{\text{AS}} = 2.5 \text{ A}$, $V_{\text{DD}} = 50 \text{ V}$, $R_{\text{G}} = 25 \Omega$, Starting $T_j = 25^\circ\text{C}$
3. $I_{\text{SD}} \leq 2.5 \text{ A}$, $di/dt \leq 200 \text{ A}/\mu\text{s}$, $V_{\text{DD}} \leq \text{BV}_{\text{DS}}$, Starting $T_j = 25^\circ\text{C}$
4. Pulse Test : Pulse width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics



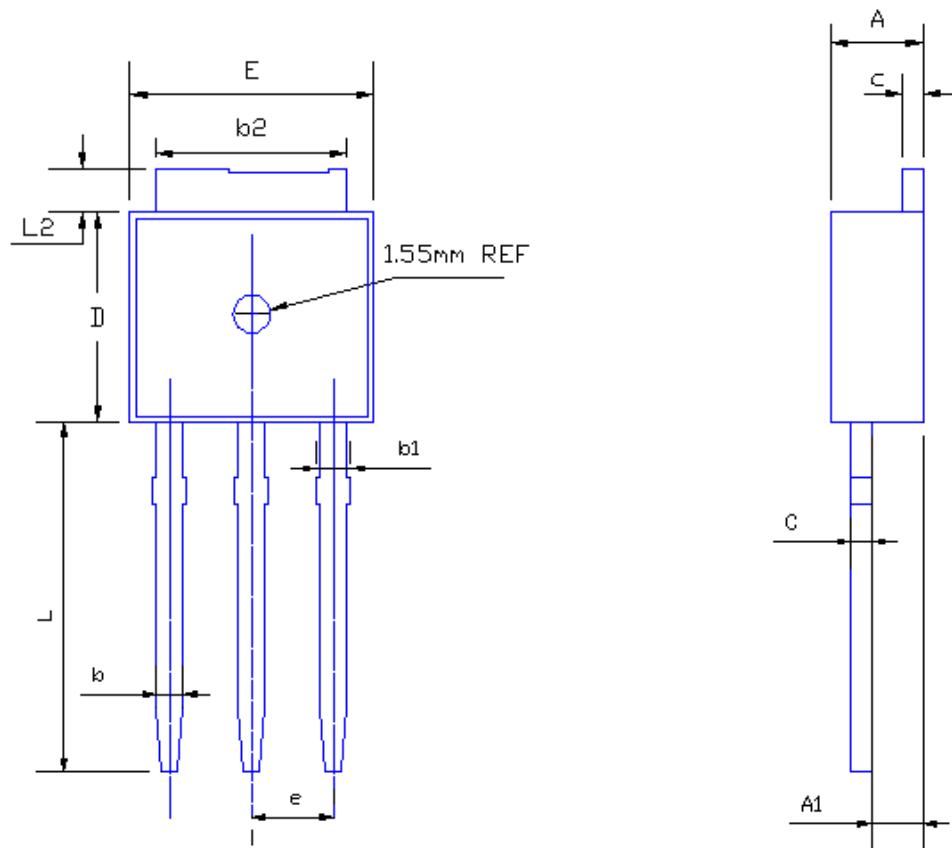


TO-252 (D-PAK) MECHANICAL DATA



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.19	2.38
A1	—	0.13
b	0.64	0.89
b2	0.84	1.14
b3	5.21	5.46
c	0.46	0.61
D	5.97	6.22
D1	5.21	—
E	6.35	6.73
E1	4.83	—
e	2.29BSC	
H	9.65	10.41
L	1.40	1.78
L2	0.51BSC	
L3	0.89	1.27
L4	0.64	1.01
θ	0	8

TO-251 (I-PAK) MECHANICAL DATA



SYMBOL	MILLIMETERS	
	MIN	MAX
A	2.19	2.38
A1	1.04	1.23
b	0.64	0.89
b1	0.84	1.14
b2	5.23	5.48
c	0.46	0.61
D	5.91	6.28
E	6.21	6.59
e	2.28 TYP	
L	8.89	9.65
L2	0.89	1.27