

MU06N090L

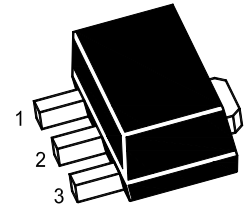
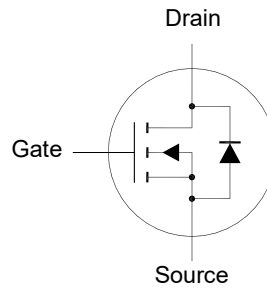
N-Channel Enhancement Mode MOSFET

Features

- Advanced trench cell design
- Surface-mounted package

Applications

- Portable appliances
- Battery management
- High speed switch
- Low power DC to DC



1.Gate 2.Drain 3.Source
SOT-89 Plastic Package

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

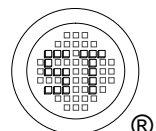
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current	I_D	3	A
Peak Drain Current, Pulsed ¹⁾	I_{DM}	12	A
Power Dissipation	P_D	1.3	W
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	$^\circ\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient ²⁾	$R_{\theta JA}$	96	$^\circ\text{C/W}$

¹⁾ Pulse Test: Pulse Width $\leq 100 \mu\text{s}$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by junction temperature $T_{J(\text{MAX})} = 150^\circ\text{C}$.

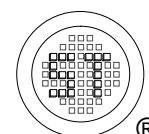
²⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate, $t \leq 10 \text{ s}$.



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Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

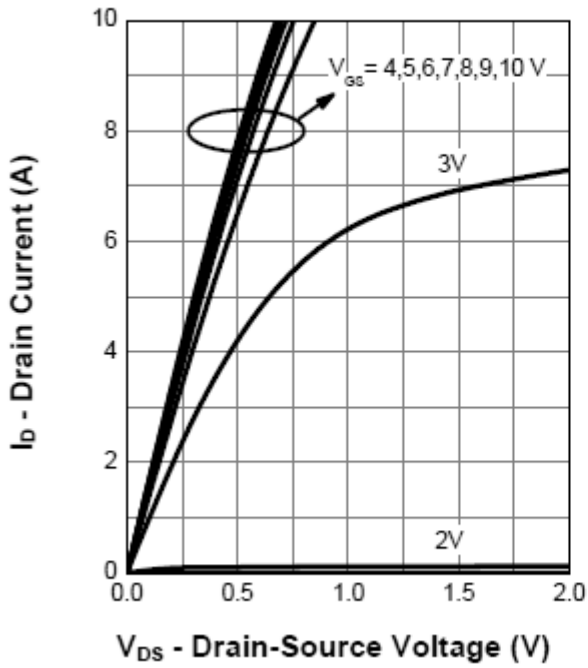
Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at $I_D = 250 \mu\text{A}$	$V_{(BR)DSS}$	60	-	-	V
Zero Gate Voltage Drain Current at $V_{DS} = 48 \text{ V}$	I_{DSS}	-	-	1	μA
Gate-Source Leakage at $V_{GS} = \pm 20 \text{ V}$	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at $V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	$V_{GS(th)}$	1	-	2	V
Drain-Source On-State Resistance at $V_{GS} = 10 \text{ V}$, $I_D = 3 \text{ A}$ at $V_{GS} = 4.5 \text{ V}$, $I_D = 3 \text{ A}$	$R_{DS(on)}$	-	-	85 90	m Ω
DYNAMIC PARAMETERS					
Input Capacitance at $V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	C_{iss}	-	498	-	pF
Output Capacitance at $V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	C_{oss}	-	25	-	pF
Reverse Transfer Capacitance at $V_{DS} = 30 \text{ V}$, $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$	C_{rss}	-	21	-	pF
Total Gate Charge at $V_{DS} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$	Q_g	-	9.5	-	nC
Gate Source Charge at $V_{DS} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$	Q_{gs}	-	2.2	-	nC
Gate Drain Charge at $V_{DS} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$	Q_{gd}	-	1.1	-	nC
Turn-On Delay Time at $V_{DS} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$	$t_{d(on)}$	-	4.5	-	ns
Turn-On Rise Time at $V_{DS} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$	t_r	-	3	-	ns
Turn-Off Delay Time at $V_{DS} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$	$t_{d(off)}$	-	14	-	ns
Turn-Off Fall Time at $V_{DS} = 30 \text{ V}$, $I_D = 2 \text{ A}$, $V_{GS} = 10 \text{ V}$, $R_G = 3.9 \Omega$	t_f	-	6	-	ns
BODY DIODE PARAMETERS					
Drain-Source Diode Forward Voltage at $V_{GS} = 0 \text{ V}$, $I_S = 2 \text{ A}$	V_{SD}	-	-	1.3	V
Body Diode Reverse Recovery Time at $I_S = 2 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$	t_{rr}	-	9	-	ns
Body Diode Reverse Recovery Charge at $I_S = 2 \text{ A}$, $di/dt = 100 \text{ A}/\mu\text{s}$	Q_{rr}	-	5	-	nC



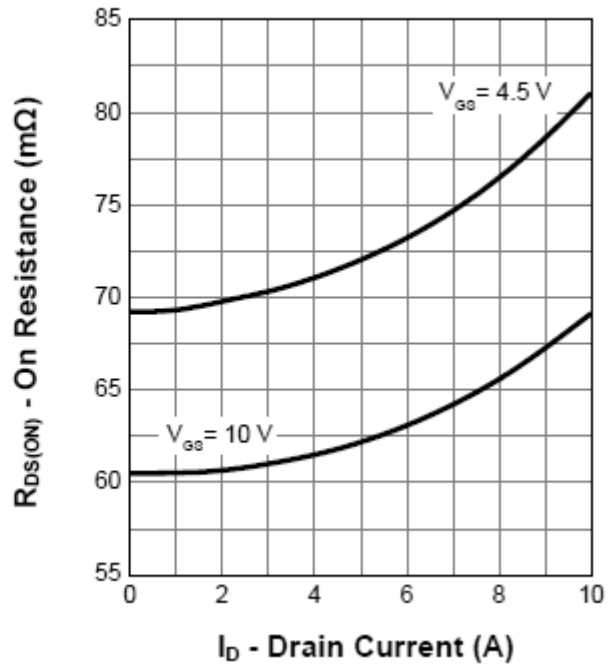
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Electrical Characteristics Curves

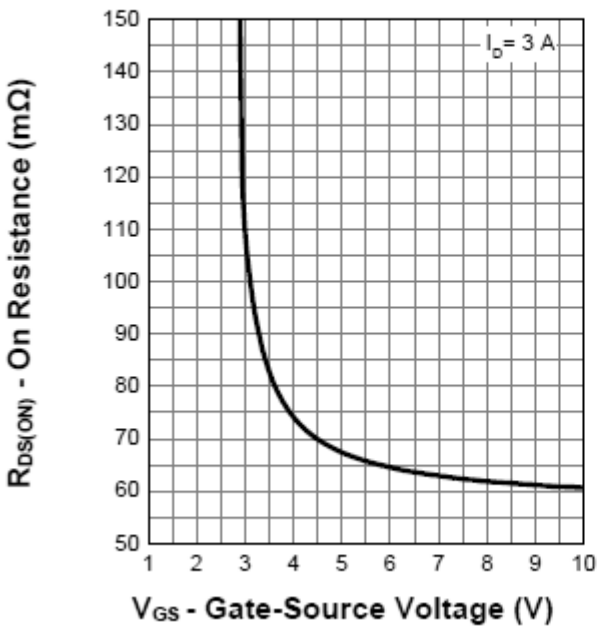
Output Characteristics



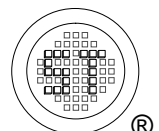
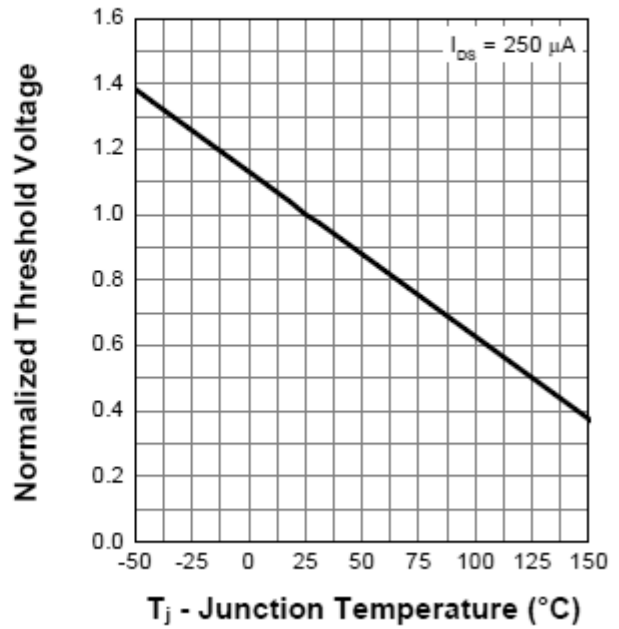
On Resistance



Transfer Characteristics

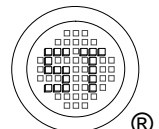
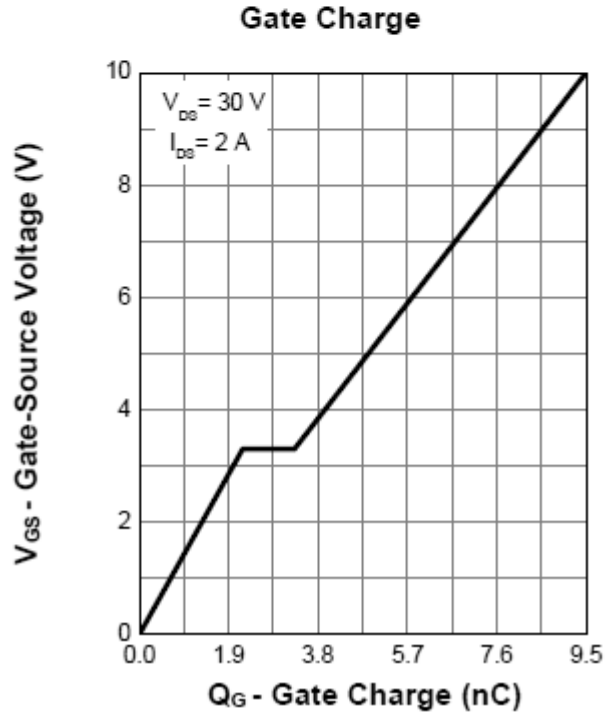
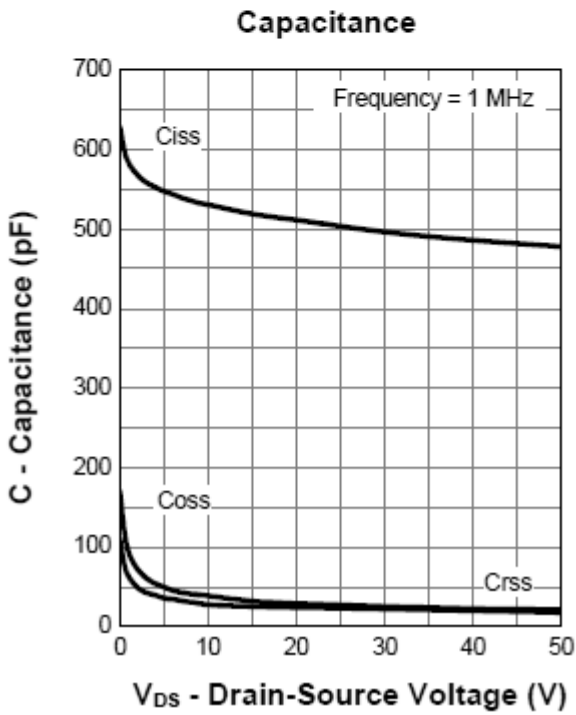
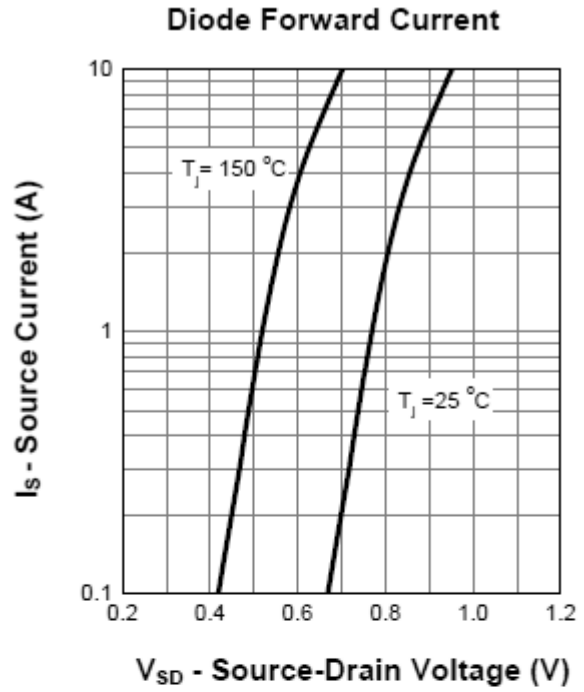
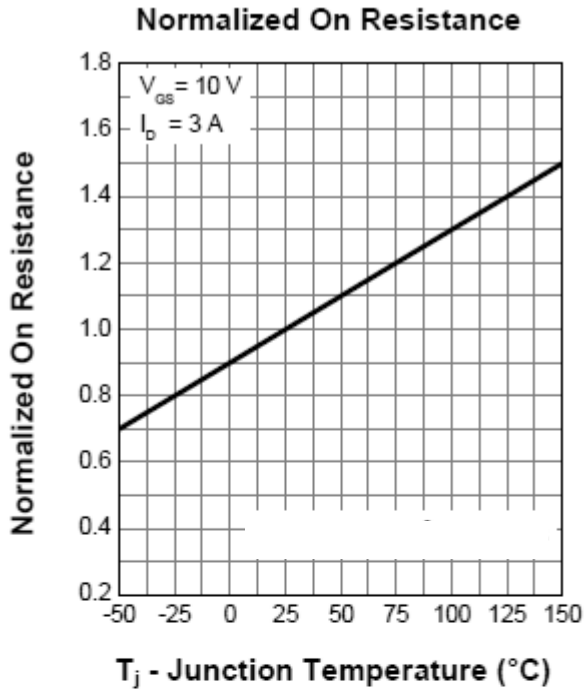


Normalized Threshold Voltage



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Electrical Characteristics Curves



Test Circuits

Fig.1-1 Switching times test circuit

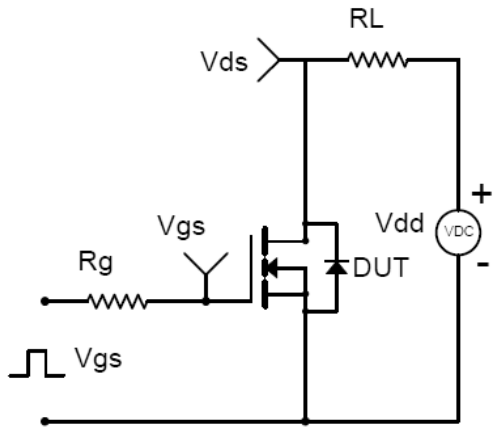


Fig.1-2 Switching Waveform

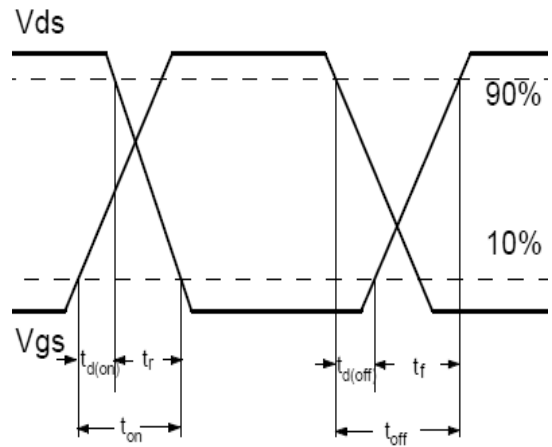


Fig.2-1 Gate charge test circuit

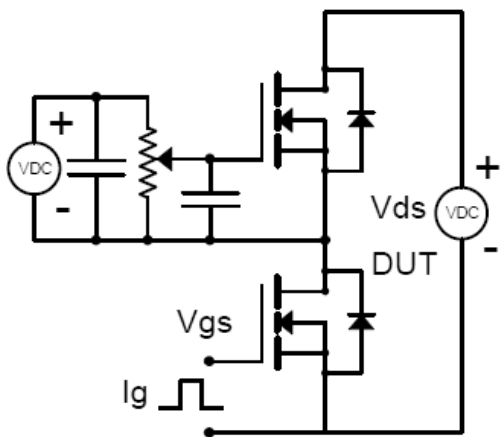
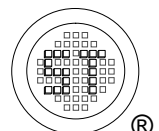
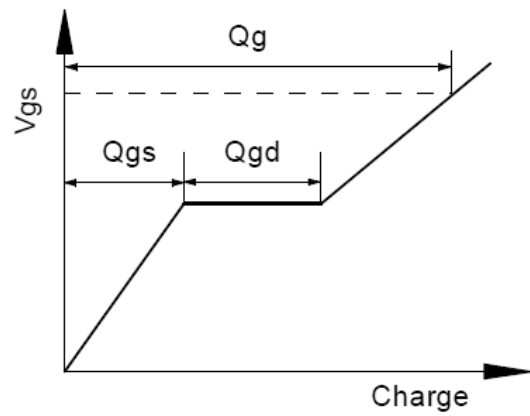


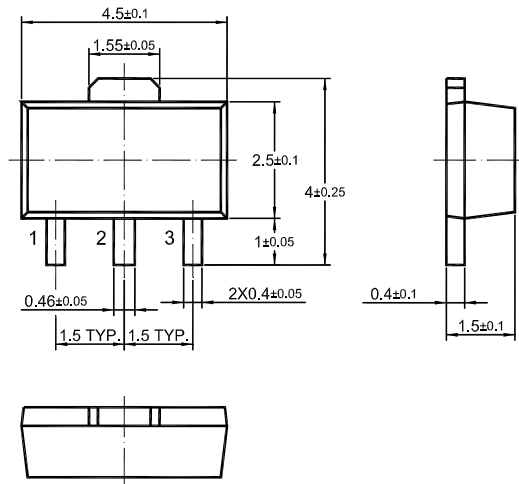
Fig.2-2 Gate charge waveform



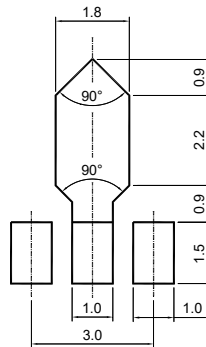
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Package Outline (Dimensions in mm)

SOT-89



Recommended Soldering Footprint



Packing information

Package	Tape Width (mm)	Pitch		Reel Size		Per Reel Packing Quantity
		mm	inch	mm	inch	
SOT-89	12	8 ± 0.1	0.315 ± 0.004	178	7	1,000
				330	13	4,000

Marking information

" MU06N090L " = Part No.
 " YM " = Date Code Marking
 " Y " = Year
 " M " = Month
 Font type: Arial

