MU10N160L

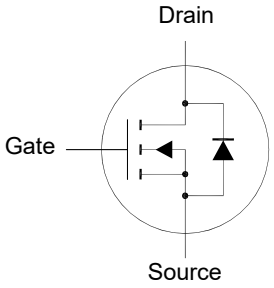
N-Channel Enhancement Mode MOSFET

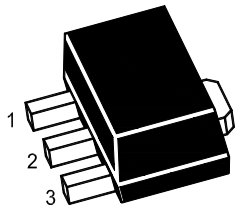
Features

• Extremely low threshold voltage

Applications

• Portable appliances
• Battery management
• High speed switch





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

Absolute Maximum Ratings (at T_a = 25℃ unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current T_c = 25℃ T_a = 25℃	I_D	6 3	A
Peak Drain Current, Pulsed [1]	I_{DM}	20	A
Total Power Dissipation [2]	P_{tot}	2	W
Operating Junction and Storage Temperature Range	T_j, T_{stg}	- 55 to + 150	℃

Thermal Resistance Ratings

Parameter	Symbol	Max.	Unit
Thermal Resistance from Junction to Ambient [2]	$R_{\theta JA}$	62.5	℃/W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	13	℃/W

[1] Pulse width ≤ 10 μs, duty cycle ≤ 1 %.

[2] Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

Dated: 13/03/2024 Rev:02

Characteristics at T_a = 25℃ unless otherwise specified

Parameter	Symbol	Min.	Typ.	Max.	Unit
STATIC PARAMETERS					
Drain-Source Breakdown Voltage at I_D = 250 µA	$V_{(BR)DSS}$	100	-	-	V
Zero Gate Voltage Drain Current at V_{DS} = 80 V	I_{DSS}	-	-	1	µA
Gate-Source Leakage at V_{GS} = ± 16 V	I_{GSS}	-	-	± 100	nA
Gate-Source Threshold Voltage at V_{DS} = V_{DS}, I_D = 250 µA	$V_{GS(th)}$	1.3	-	2.5	V
Drain-Source On-State Resistance at V_{GS} = 10 V, I_D = 6 A at V_{GS} = 4.5 V, I_D = 4 A	$R_{DS(on)}$	- -	- -	150 160	mΩ
DYNAMIC PARAMETERS					
Forward Transconductance at V_{DS} = 5 V, I_D = 4 A	g_{Fs}	-	9.8	-	S
Gate Resistance at V_{DS} = 0 V, V_{GS} = 0 V, f = 1 MHz	R_g	-	1.1	-	Ω
Input Capacitance at V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	C_{iss}	-	1155	-	pF
Output Capacitance at V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	C_{oss}	-	28	-	pF
Reverse Transfer Capacitance at V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	C_{rss}	-	25	-	pF
Gate Charge Total at V_{DS} = 50 V, V_{GS} = 10 V, I_D = 4 A at V_{DS} = 50 V, V_{GS} = 4.5 V, I_D = 4 A	Q_g	- -	20 9	- -	nC
Gate to Source Charge at V_{DS} = 50 V, V_{GS} = 10 V, I_D = 4 A	Q_{gs}	-	4	-	nC
Gate to Drain Charge at V_{DS} = 50 V, V_{GS} = 10 V, I_D = 4 A	Q_{gd}	-	2.4	-	nC
Turn-On Delay Time at V_{DS} = 50 V, V_{GS} = 10 V, I_D = 4 A, R_g = 3.3 Ω	$t_{d(on)}$	-	14	-	ns
Turn-On Rise Time at V_{DS} = 50 V, V_{GS} = 10 V, I_D = 4 A, R_g = 3.3 Ω	t_r	-	4	-	ns
Turn-Off Delay Time at V_{DS} = 50 V, V_{GS} = 10 V, I_D = 4 A, R_g = 3.3 Ω	$t_{d(off)}$	-	13	-	ns
Turn-Off Fall Time at V_{DS} = 50 V, V_{GS} = 10 V, I_D = 4 A, R_g = 3.3 Ω	t_f	-	2	-	ns
Body-Diode PARAMETERS					
Drain-Source Diode Forward Voltage at V_{GS} = 0 V, I_S = 1 A	V_{SD}	-	-	1.3	V
Body-Diode Continuous Current	I_S	-	-	3	A
Body Diode Reverse Recovery Time at I_S = 4 A, di/dt = 100 A / µs	t_{rr}	-	21	-	ns
Body Diode Reverse Recovery Charge at I_S = 4 A, di/dt = 100 A / µs	Q_{rr}	-	22	-	nC

Electrical Characteristics Curves

Fig. 1 Typical Output Characteristics

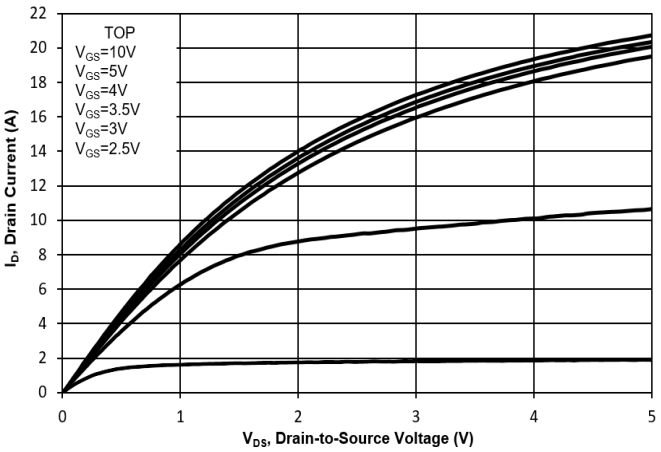


Fig. 2 Typical Transfer Characteristics

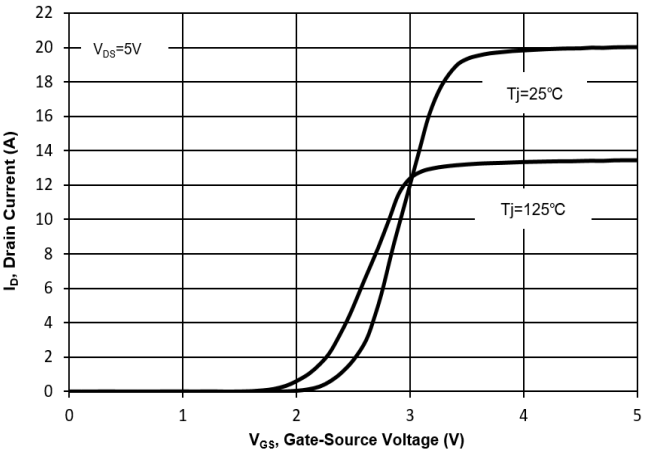


Fig. 3 On-Resistance vs. Drain Current

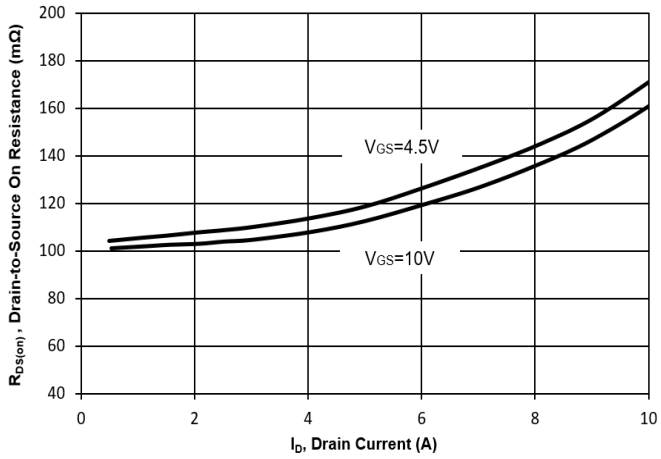


Fig. 4 On-Resistance vs. Gate-Source Voltage

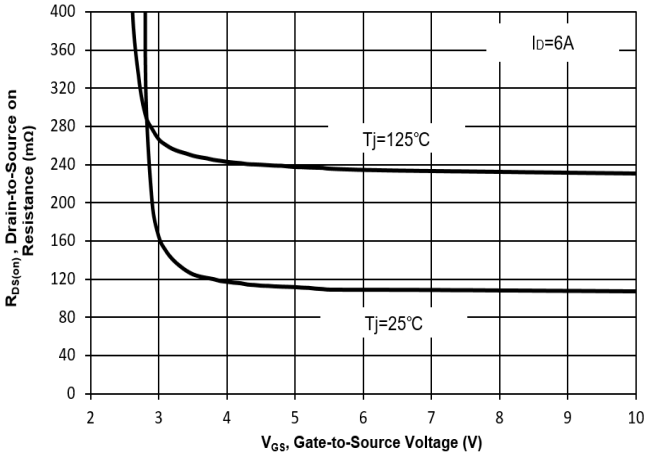


Fig. 5 On-Resistance vs.T_j

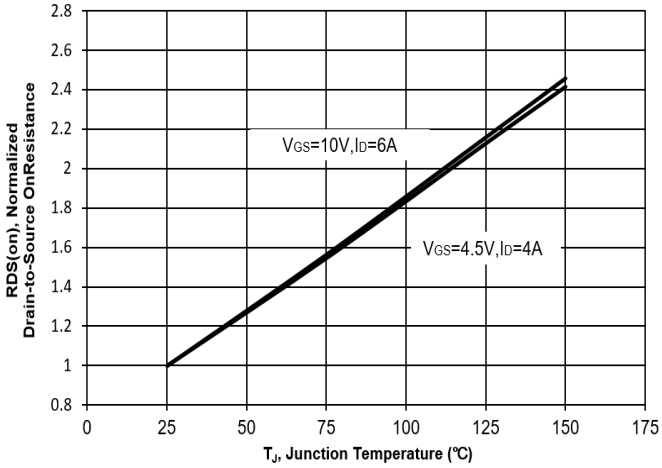
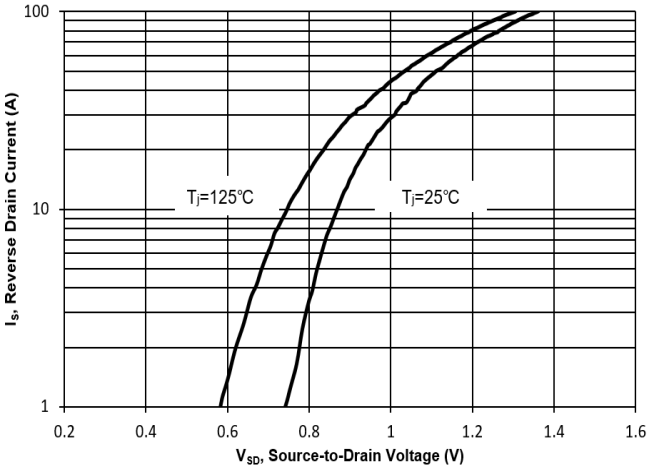


Fig. 6 Typical Body-Diode Forward Characteristics



Electrical Characteristics Curves

Fig. 7 Typical Junction Capacitance

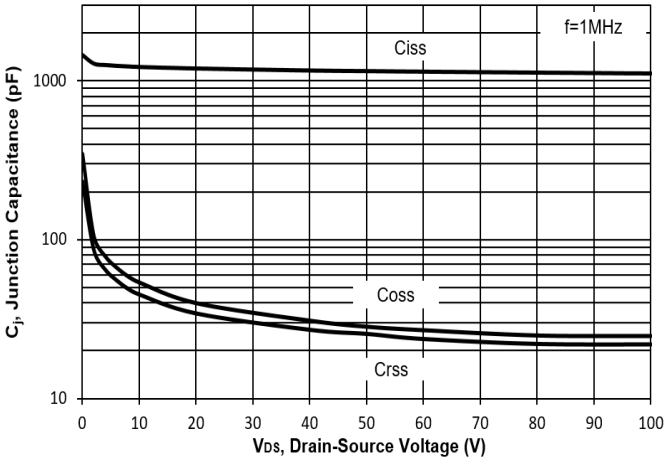


Fig. 8 Drain-Source Leakage Current vs. T_j

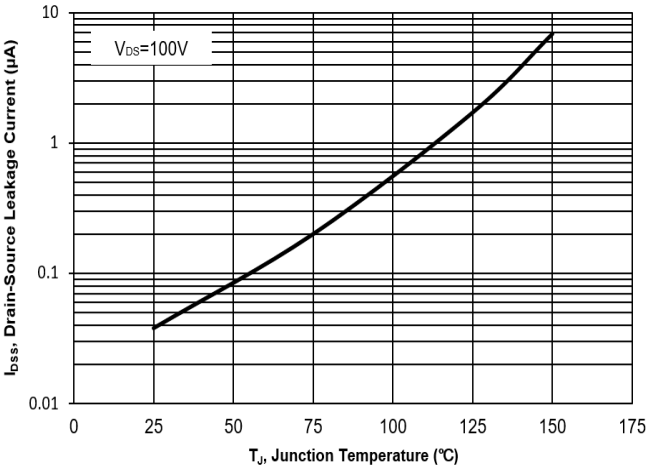


Fig. 9 $V_{(BR)DSS}$ vs. Junction Temperature

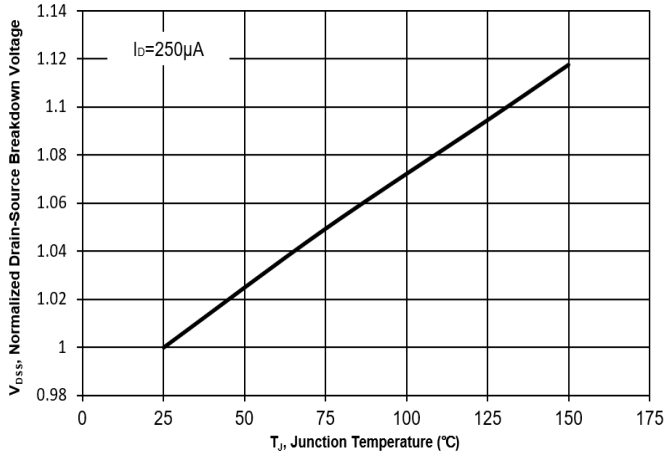


Fig. 10 Gate Threshold Variation vs. T_j

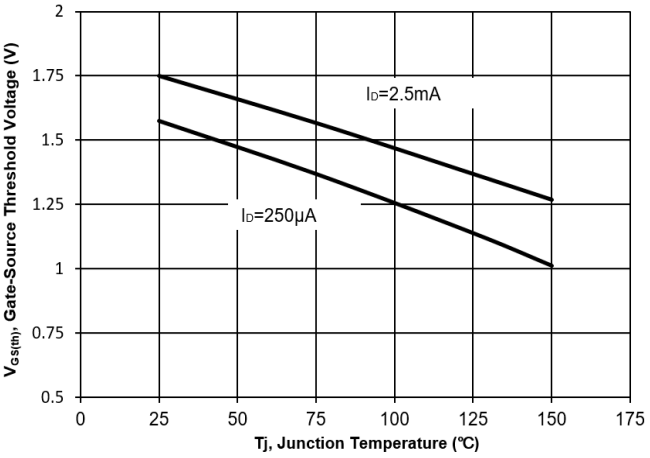
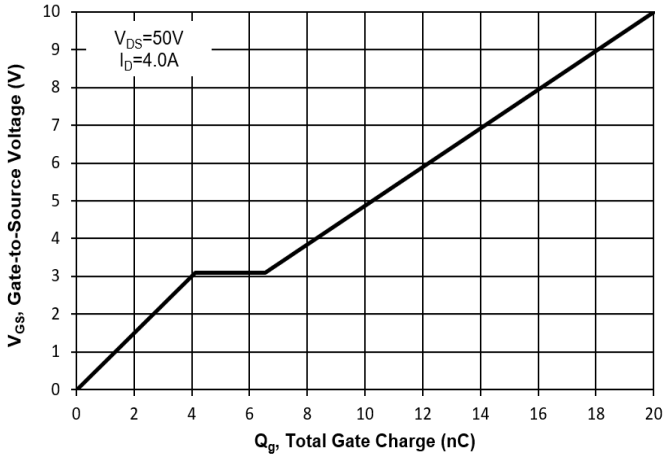


Fig. 11 Gate Charge



Test Circuits

Fig.1-1 Switching times test circuit

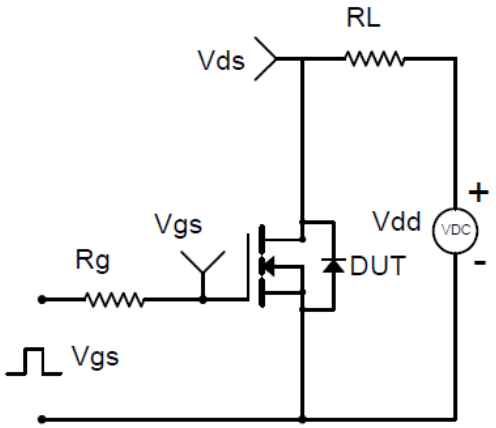


Fig.1-2 Switching Waveform

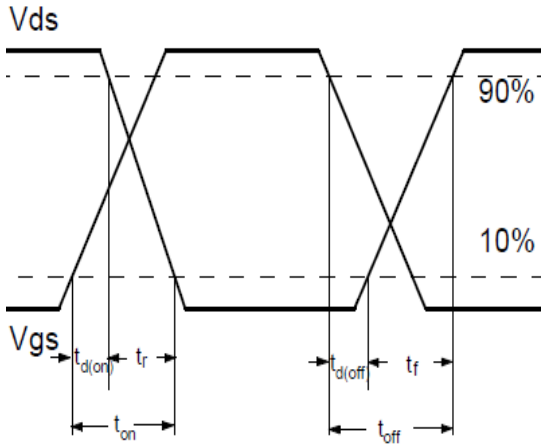


Fig.2-1 Gate charge test circuit

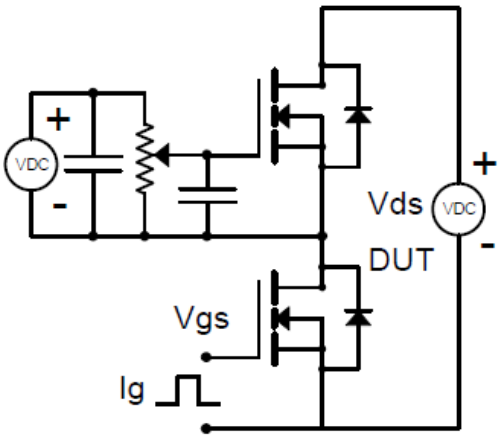
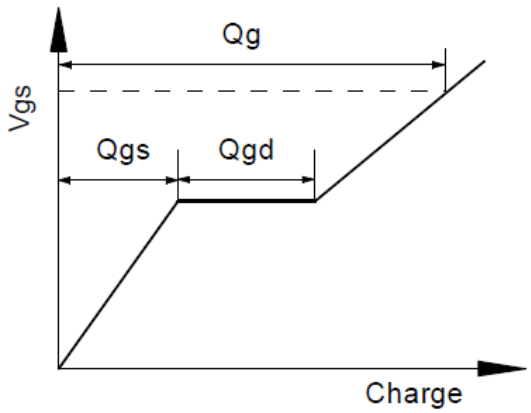
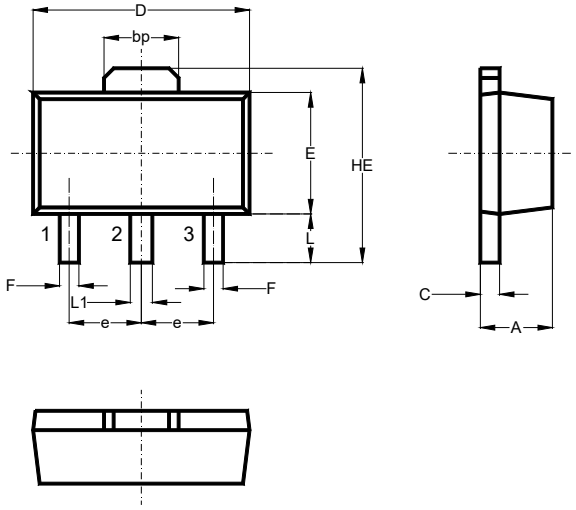


Fig.2-2 Gate charge waveform

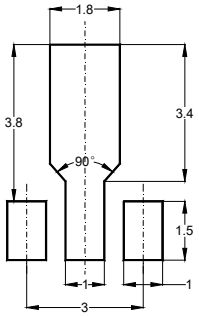


Package Outline (Dimensions in mm) SOT-89



Unit	A	bp	C	D	E	F	HE	e	L	L1
mm	1.6 1.4	1.60 1.50	0.5 0.3	4.6 4.4	2.6 2.4	0.45 0.35	4.25 3.75	1.5 typ.	1.05 0.95	0.51 0.41

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

" MU10N160L " = Part No.
" YM " = Date Code Marking
" Y " = Year
" M " = Month
Font type: Arial