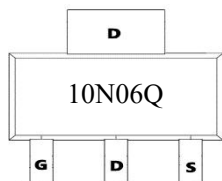

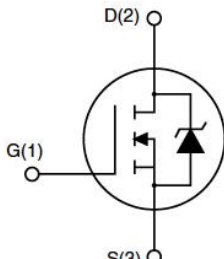


<b>Features</b> <ul style="list-style-type: none"><li>➤ Super Low Gate Charge</li><li>➤ Green Device Available</li><li>➤ Excellent Cdv/dt effect decline</li><li>➤ Advanced high cell density Trench technology</li></ul>	<b>Bvdss</b>	<b>Rdson</b>	<b>ID</b>
	<b>60V</b>	<b>40mΩ</b>	<b>10A</b>
	<b>Application</b> <ul style="list-style-type: none"><li>➤ PWM applications</li><li>➤ Load Switch</li><li>➤ Power management</li></ul>		

**RoHS**

<b>Package</b>		
		
Marking and pin assignment	SOT89-3L top view	Schematic diagram

## Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
10N06	10N06Q	SOT89-3L	1000

## Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	60	V
Gate-Source Voltage		$V_{GS}$	±20	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	$I_D$	10	A
	$T_C = 100^\circ\text{C}$		6.8	A
Pulsed Drain Current <sup>1</sup>		$I_{DM}$	30	A
Single Pulse Avalanche Energy <sup>2</sup>		$E_{AS}$	6.3	mJ
Total Power Dissipation <sup>4</sup>	$T_C = 25^\circ\text{C}$	$P_D$	4	W
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +175	°C



## Thermal Resistance Ratings

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction to Ambient <sup>3</sup>	$R_{\theta JA}$	--	--	$^{\circ}\text{C/W}$
Thermal Resistance Junction-case	$R_{\theta JC}$	--	63	$^{\circ}\text{C/W}$

## Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
10N06Q	SOT89-3L	1	2	3	Tape Reel

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Drain-Source Breakdown Voltage	B <sub>VDSS</sub>	I <sub>D</sub> =250uA, V <sub>GS</sub> =0V	60	---	---	V	
Static Drain-Source On-Resistance <sup>3</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V , I <sub>D</sub> =15A	---	40	49	m Ω	
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =10A	---	45	63		
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1	1.6	2.5	V	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	---	---	1.0	uA	
Gate to Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =± 20V , V <sub>DS</sub> =0V	---	---	± 100	nA	
Total Gate Charge	Q <sub>G</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =4.5A	---	14	---	nC	
Gate-Source Charge	Q <sub>GS</sub>		---	2.9	---		
Gate-Drain Charge	Q <sub>gd</sub>		---	5.2	---		
Turn-On Delay Time	T <sub>D(ON)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =2A, R <sub>L</sub> =6.7 Ω , R <sub>GEN</sub> =3 Ω	---	5	---	ns	
Turn-On Rise Time	T <sub>R</sub>		---	2.6	---		
Turn-Off Delay Time	T <sub>D(OFF)</sub> )		---	16.1	---		
Turn-Off Fall Time	T <sub>F</sub>		---	2.3	---		
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =25V , V <sub>GS</sub> =0V , f=1MHz	---	825	---	pF	
Output Capacitance	C <sub>OSS</sub>		---	49	---		
Reverse Transfer Capacitance	C <sub>RSS</sub>		---	41	---		
Maximum Continuous Drain to Source Diode Forward Current			I <sub>S</sub>	-	-	10	A
Maximum Pulsed Drain to Source Diode Forward Current			I <sub>SM</sub>	-	-	30	A
Drain to Source Diode Forward Voltage	V <sub>GS</sub> = 0V, I <sub>S</sub> = 15A		V <sub>SD</sub>	-	-	1.2	V
Body Diode Reverse Recovery Time	T <sub>J</sub> =25°C, I <sub>F</sub> =15A,		T <sub>rr</sub>	-	35	-	ns
Body Diode Reverse Recovery Charge	di/dt = 100A/us		Q <sub>rr</sub>	-	53	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition: Starting  $T_J=25^\circ\text{C}$ ,  $V_{DD}=30\text{V}$ ,  $V_G=10\text{V}$ ,  $R_G=25\ \Omega$ ,  $L=0.5\text{mH}$ ,  $I_{AS}=6.1\text{A}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycle $\leq 0.5\%$ .

## Typical Electrical and Thermal Characteristics

Figure 1. Output Characteristics

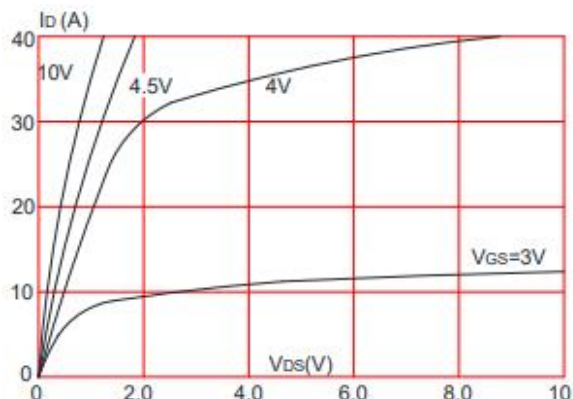


Figure 2. Typical Transfer Characteristics

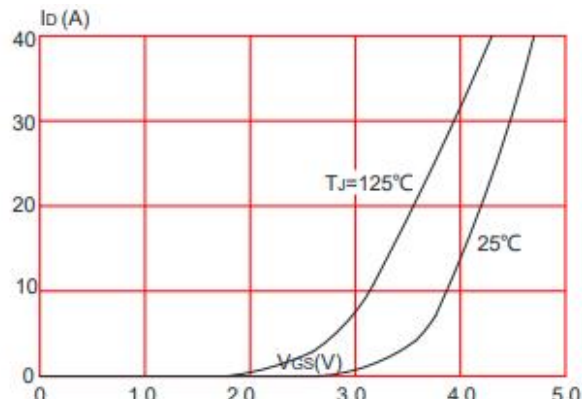


Figure 3. On-resistance vs. Drain Current

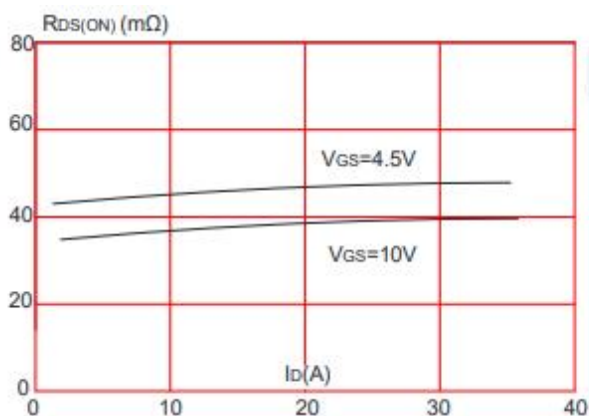


Figure 4. Body Diode Characteristics

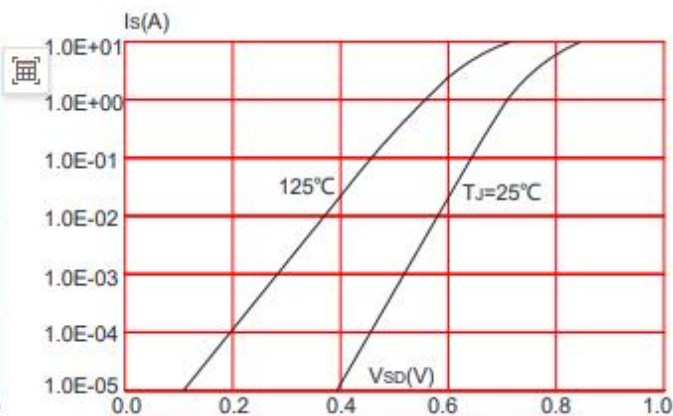


Figure 5. Gate Charge Characteristics

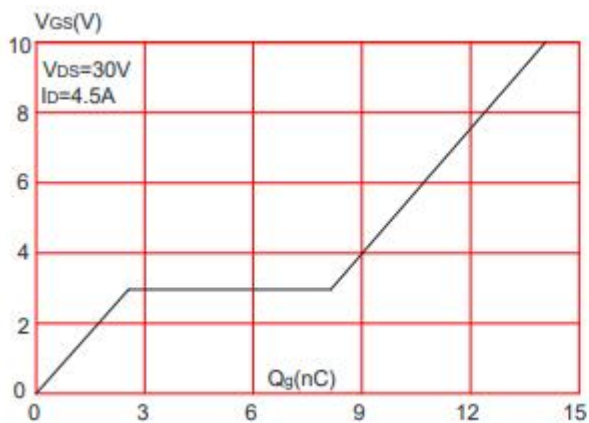


Figure 6. Capacitance Characteristics

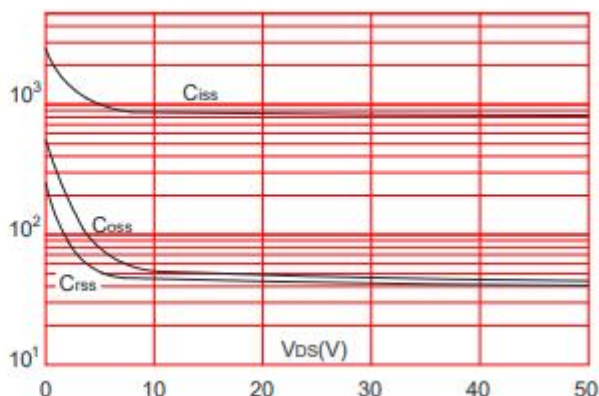


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

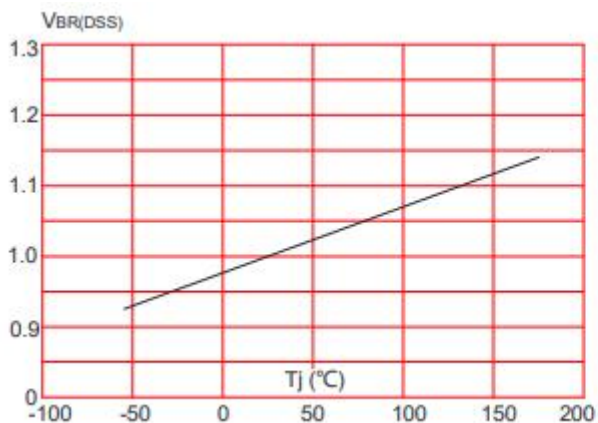


Figure 8. Normalized on Resistance vs. Junction Temperature

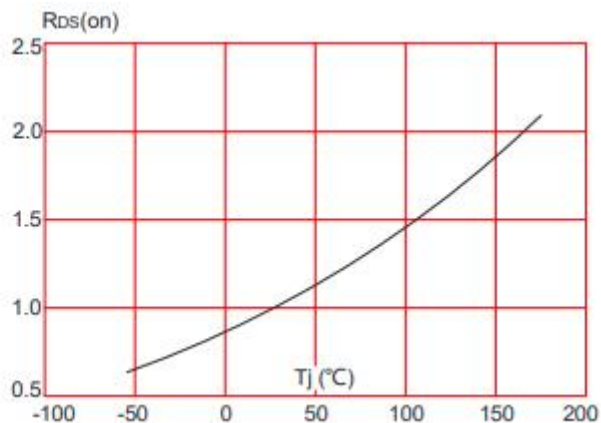


Figure 9. Maximum Safe Operating Area

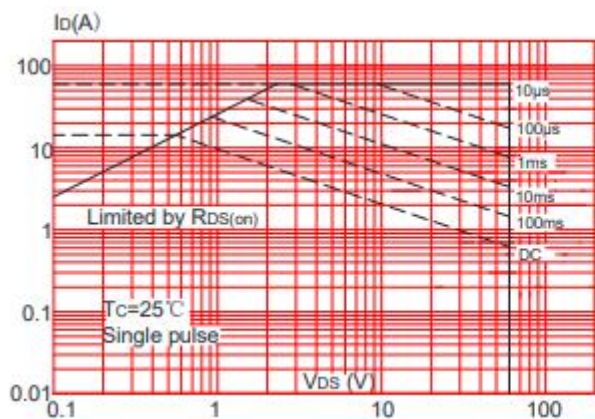


Figure 10. Maximum Continuous Drian Current vs. Case Temperature

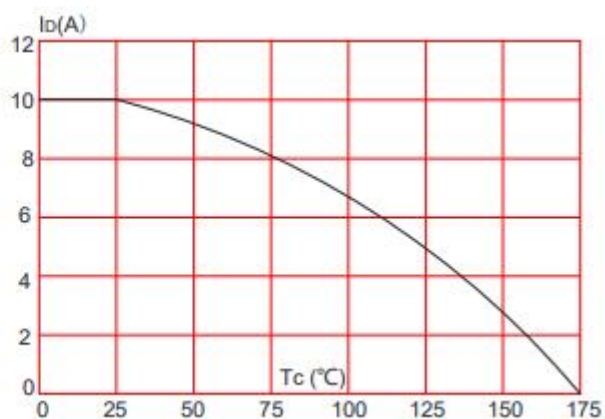
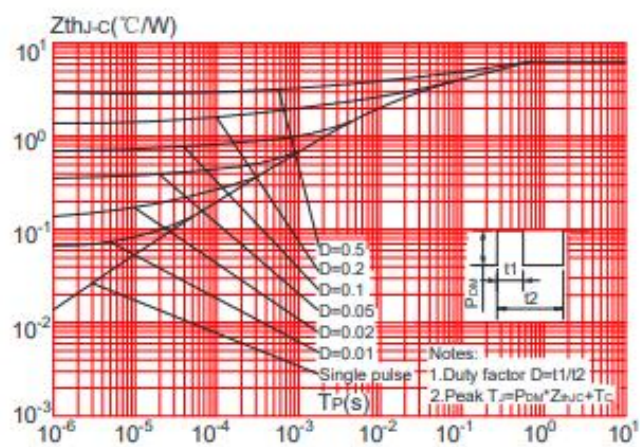
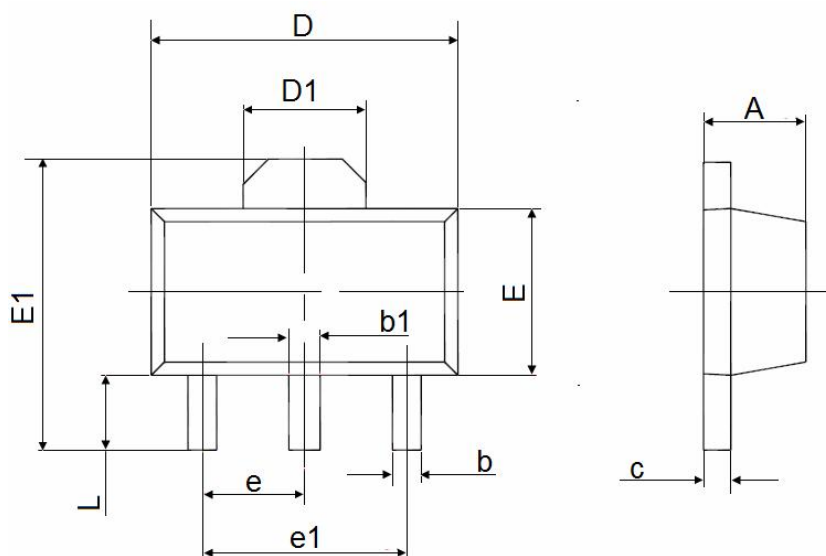


Figure 11: Normalized Maximum Transient Thermal Impedance, Junction-to-Case



## Package Dimensions SOT89-3L



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

**Important Notice and Disclaimer**

HL Microelectronics reserves the right to make changes to this document and its products and specifications at any time without notice.

Customers should obtain and confirm the latest product information and specifications before final design, purchase or use.

HL Microelectronics makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, not does HL Microelectronics assume any liability for application assistance or customer product design.

HL Microelectronics does not warrant or accept any liability with products which are purchased or used for any unintended or unauthorized application.

No license is granted by implication or otherwise under any intellectual property rights of HL Microelectronics.

HL Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of HL Microelectronics.