

Features ➤ Super Low Gate Charge ➤ Green Device Available ➤ Excellent Cdv/dt effect decline ➤ Advanced high cell density Trench technology	Bvdss	Rdson	ID
	-30V	20mΩ	-9A
Application ➤ Battery protection ➤ Load Switch ➤ Uninterruptible power supply			
Package Marking and pin assignment SOT23-3L top view Schematic diagram			

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
30P09	30P09L	SOT23-3L	3000

Absolute Maximum Ratings (TA=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V _{DS}	-30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current	I _D @T _A =25°C	-9	A
	I _D @T _A =70°C	-5	A
Pulsed Drain Current ¹	I _{DM}	-36	A
Single Pulsed Avalanche Energy ²	E _{AS}	25	mJ
Total Power Dissipation	P _D @T _A =25°C	3	W
Storage Temperature Range	T _{STG}	-55 to 150	°C
Operating Junction Temperature Range	T _J	-55 to 150	°C

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient	R _{θJA}	48	°C/W
Thermal Resistance Junction-Case	R _{θJC}	-	°C/W



Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	S	D	
HL30P09L	SOT23-3L	1	2	3	Tape Reel

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V$	-	-	-1	μA
Gate to Body Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.5	-2.5	V
Static Drain-Source On-Resistance ³	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-9A$	-	20	25	m Ω
		$V_{GS}=-4.5V, I_D=-5A$	-	27	38	
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V,$ $f=1\text{MHz}$	-	900	-	pF
Output Capacitance	C_{oss}		-	125	-	
Reverse Transfer Capacitance	C_{rss}		-	109	-	
Total Gate Charge	Q_g	$V_{DS}=-15V, V_{GS}=-10V, I_D=-8A$	-	42	-	nC
Gate-Source Charge	Q_{gs}		-	8.8	-	
Gate-Drain ("Miller") Charge	Q_{gd}		-	7.3	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{GS}=-10V, V_{DD}=-15V,$ $R_G=6\Omega, I_D=-1A$	-	13	-	ns
Rise Time	t_r		-	15	-	
Turn-off Delay Time	$t_{d(off)}$		-	198	-	
Fall Time	t_f		-	98	-	
Maximum Continuous Drain to Source Diode Forward Current	I_S	-	-	-	-9	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}	-	-	-	-36	A
Drain to Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-9A$	-	-0.8	-1.2	V

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=-15V$, $V_G=-10V$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=-10A$.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.

Typical Performance Characteristics

Figure 1: Output Characteristics

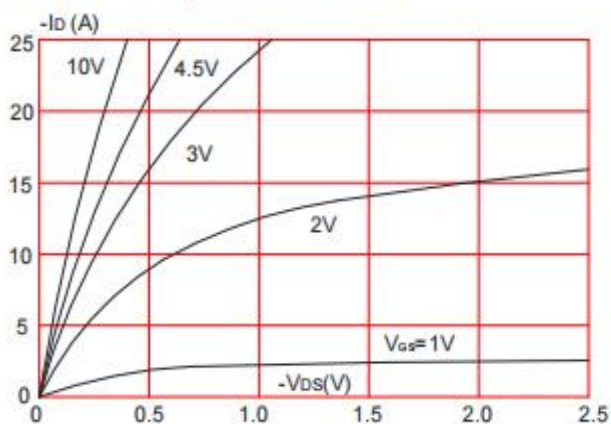


Figure 2: Typical Transfer Characteristics

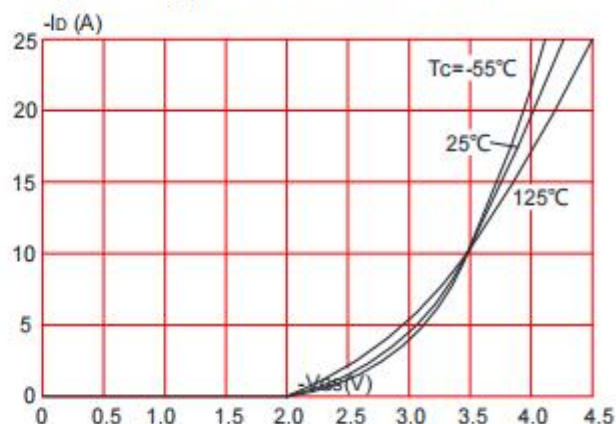


Figure 3: On-resistance vs. Drain Current

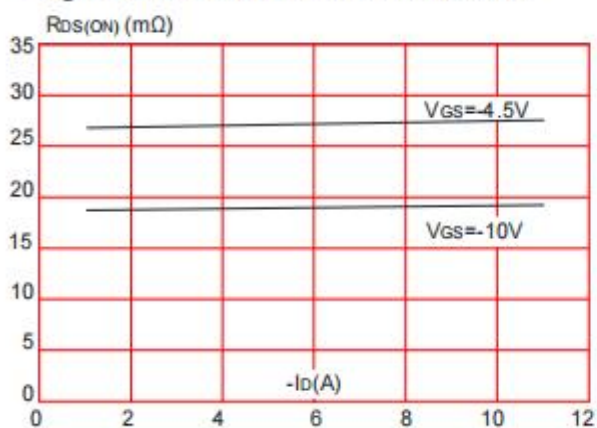


Figure 4: Body Diode Characteristics

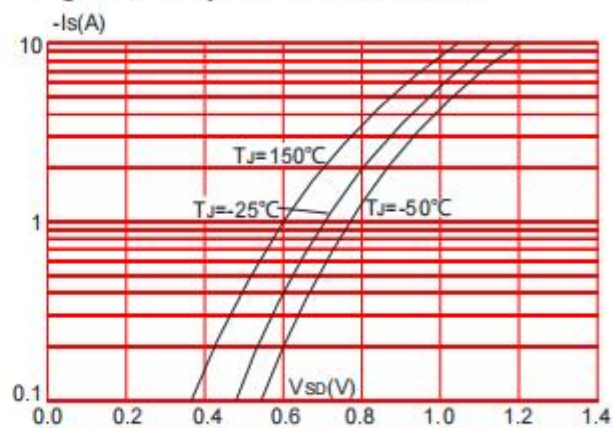


Figure 5: Gate Charge Characteristics

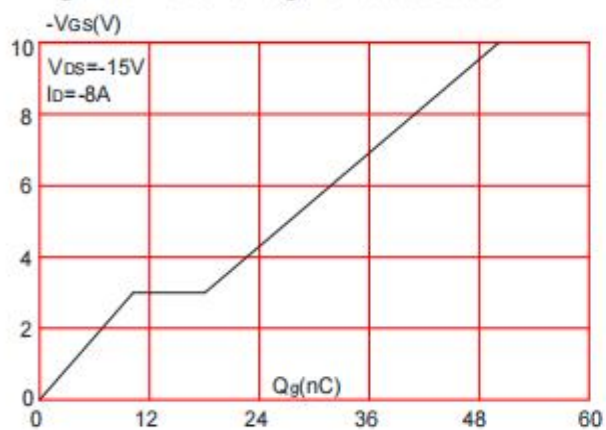


Figure 6: Capacitance Characteristics

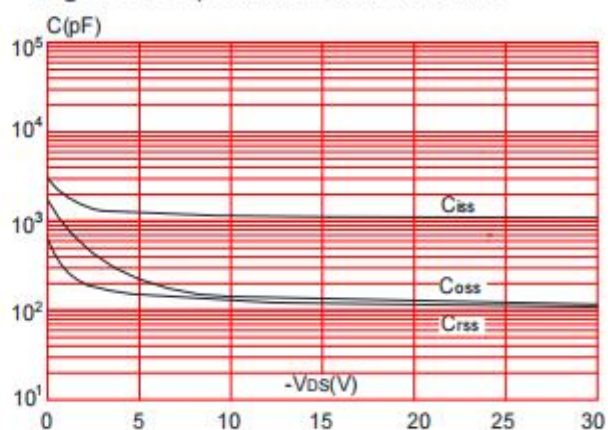


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

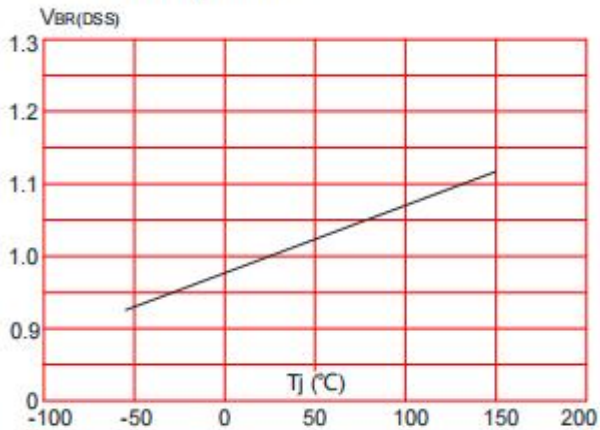


Figure 8: Normalized on Resistance vs. Junction Temperature

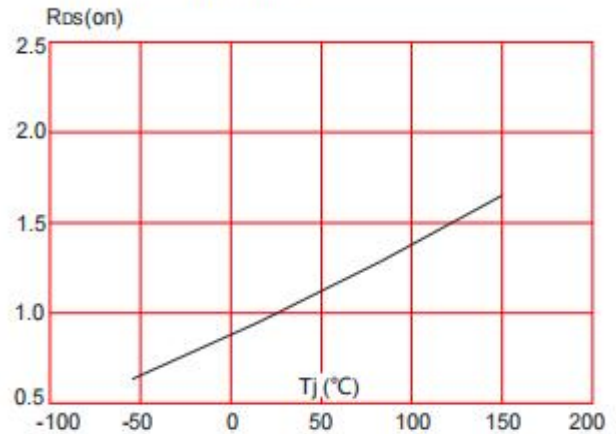


Figure 9: Maximum Safe Operating Area

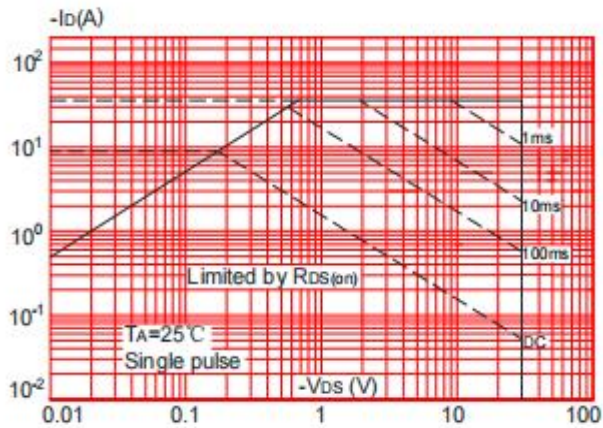


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

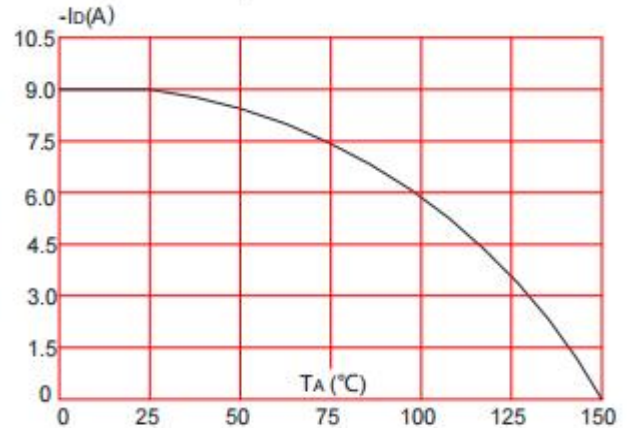
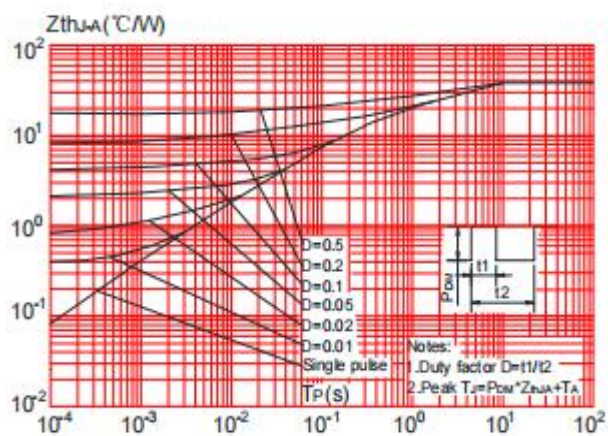
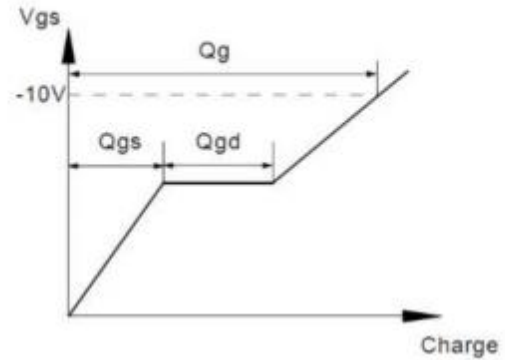
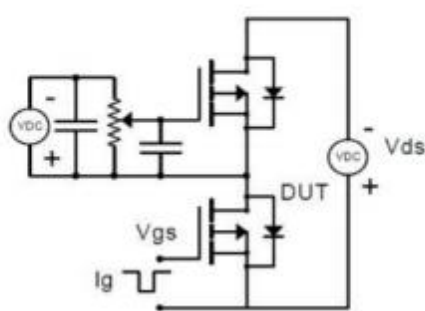


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

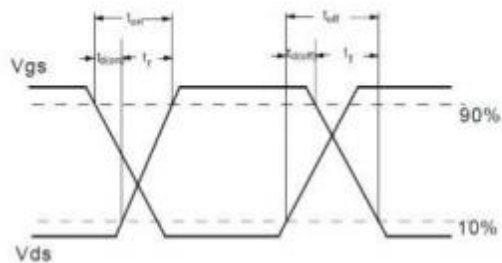
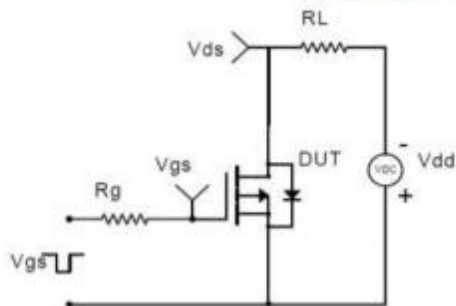


Test Circuit

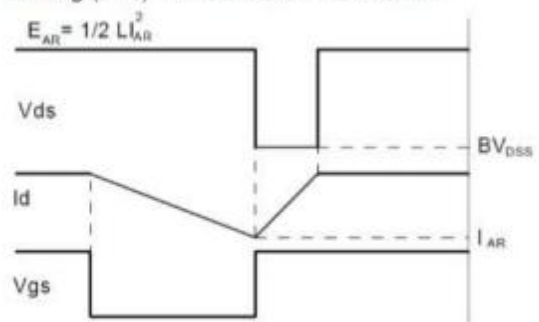
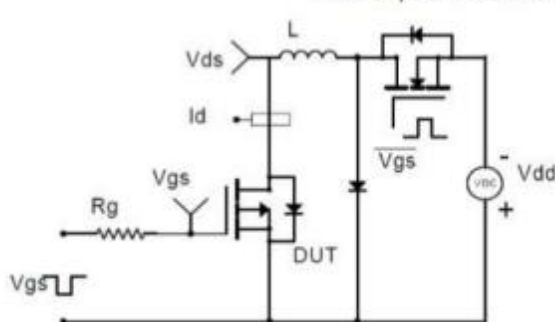
Gate Charge Test Circuit & Waveform



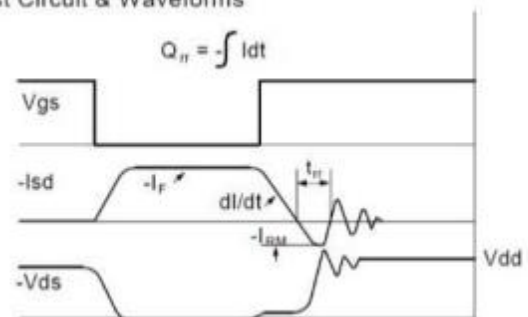
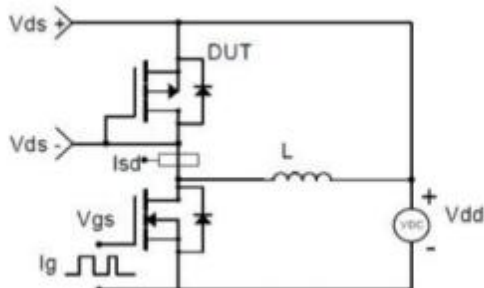
Resistive Switching Test Circuit & Waveforms



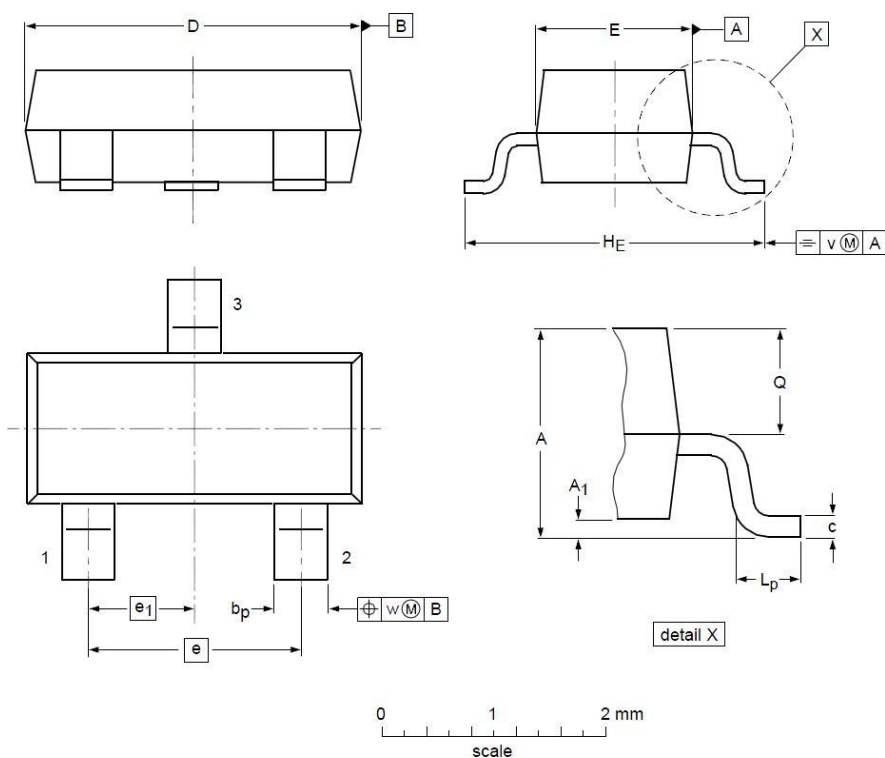
Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms



Package Dimensions SOT23-3L



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°



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