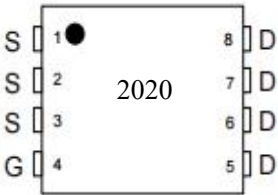
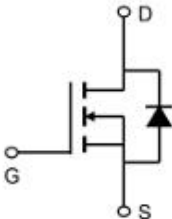


Features ➤ Super Low Gate Charge ➤ Green Device Available ➤ Excellent CdV/dt effect decline ➤ 100% EAS Guaranteed ➤ Advanced high cell density Trench technology	Bvdss	Rdson	ID
	20V	4.8mΩ	20A
	Application ➤ DC-DC Converters ➤ Power management function ➤ Synchronous-rectification applications		



Package		
 Marking and pin assignment	 SOP-8 top view	 Schematic diagram

Package Marking and Ordering Information

Device Marking	Device	Device Package	Quantity
2020	2020S	SOP-8	3000

Absolute Maximum Ratings ($T_C=25^{\circ}\text{C}$ unless otherwise specified)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 20	V
Continuous Drain Current, $V_{GS}@10V^1$	$T_C=25^{\circ}\text{C}$	I_D	20	A
	$T_C=100^{\circ}\text{C}$	I_D	11	A
Pulsed Drain Current ²		I_{DM}	80	A
Single Pulsed Avalanche Energy ³		EAS	48	mJ
Total Power Dissipation	$T_C=25^{\circ}\text{C}$	P_D	38	W
Operating Junction Temperature Range		T_J	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +150	$^{\circ}\text{C}$

Thermal Resistance Ratings

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-Ambient	$R_{\theta JA}$	-	$^{\circ}\text{C}/\text{W}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	4.2	$^{\circ}\text{C}/\text{W}$



Ordering Information

Ordering Number	Package	Pin Assignment			Packing
Halogen Free		G	D	S	
HL2020S	SOP-8	4	5,6,7,8	1,2,3	Tape Reel

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Units
Drain to Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	20	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=20V, V_{GS}=0V$	-	-	1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.7	1	V
Static Drain-Source On-Resistance ³	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=10A$	-	4.8	6.5	m Ω
		$V_{GS}=2.5V, I_D=5A$	-	6.8	10	m Ω
Input Capacitance	C_{iss}	$V_{DS}=10V, V_{GS}=0V,$ $f=1.0MHz$	-	1832	-	pF
Output Capacitance	C_{oss}		-	289	-	
Reverse Transfer Capacitance	C_{rss}		-	271	-	
Total Gate Charge	Q_g	$V_{DS}=10V, I_D=10A,$ $V_{GS}=4.5V$	-	23	-	nC
Gate Source Charge	Q_{gs}		-	4.5	-	
Gate Drain("Miller")Charge	Q_{gd}		-	7.3	-	
Turn-on Delay Time	$t_{d(on)}$	$V_{DS}=10V, I_D=10A,$ $R_G=3\Omega, V_{GS}=4.5V$	-	15	-	ns
Turn-on Rise Time	t_r		-	37	-	
Turn-off Delay Time	$t_{d(off)}$		-	52	-	
Turn-off Fall Time	t_f		-	21	-	
Maximum Continuous Drain to Source Diode Forward Current	I_S		-	-	20	A
Maximum Pulsed Drain to Source Diode Forward Current	I_{SM}		-	-	80	A
Drain to Source Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=10A$	-		1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F=25A, dI/dt=100A/\mu s$	-	25	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	21	-	nC

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
2. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=10V, V_G=4.5V, L=0.5mH, R_G=25\Omega, I_{AS}=4.8A$.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

Figure1: Output Characteristics

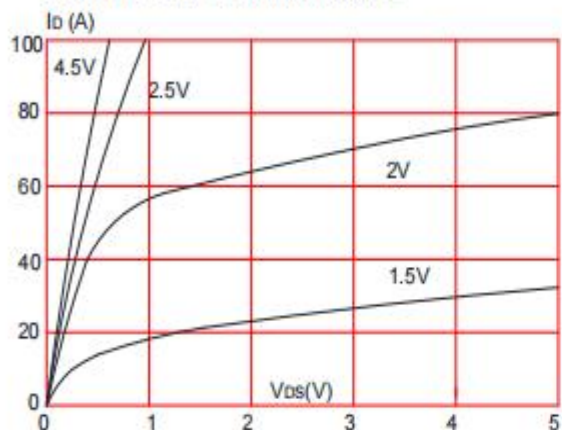


Figure 2: Typical Transfer Characteristics

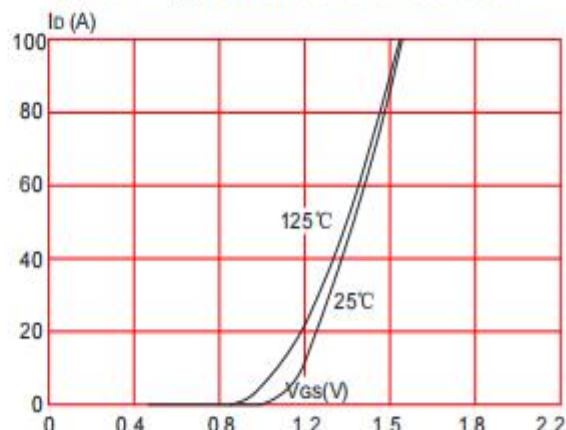


Figure 3: On-resistance vs. Drain Current

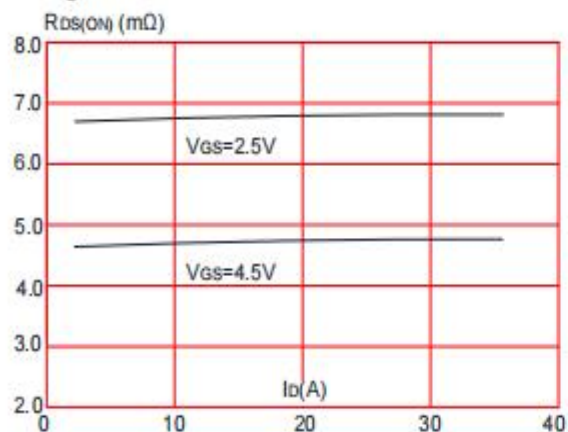


Figure 4: Body Diode Characteristics

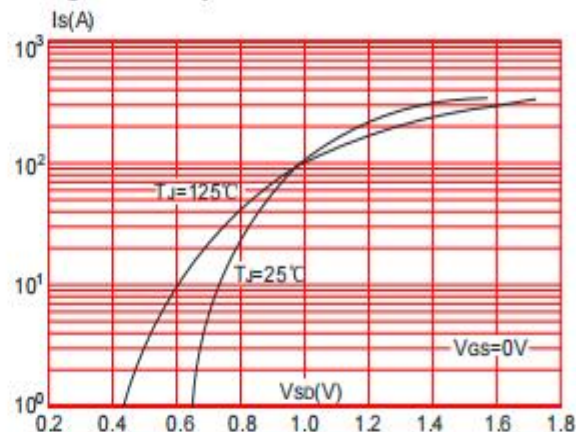


Figure 5: Gate Charge Characteristics

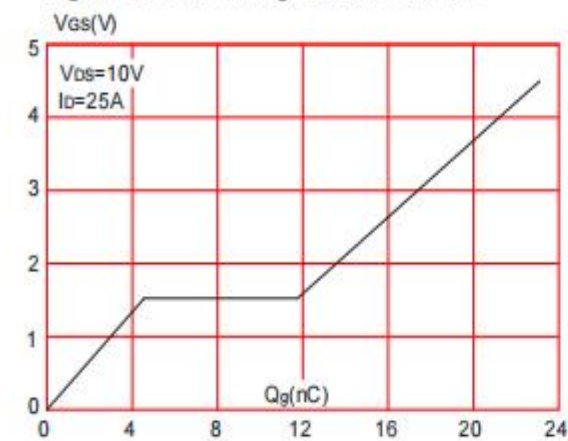


Figure 6: Capacitance Characteristics

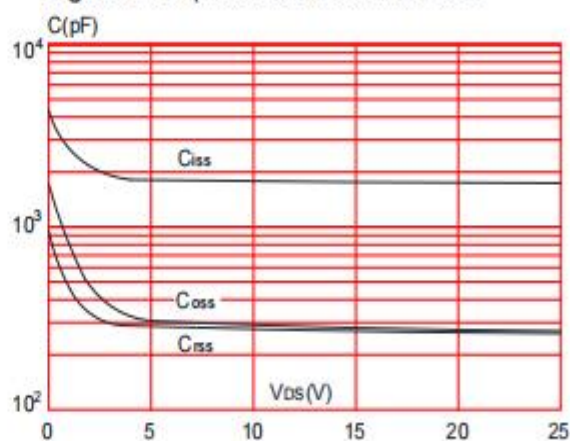


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

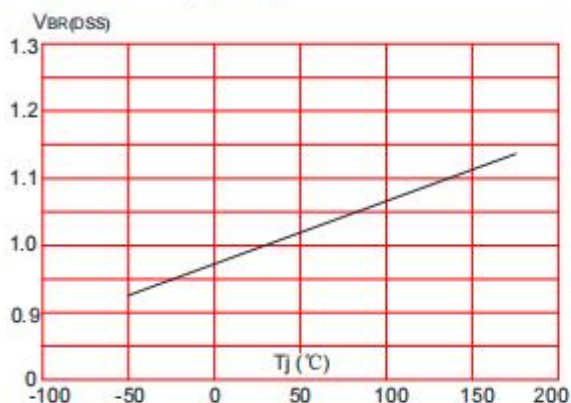


Figure 8: Normalized on Resistance vs. Junction Temperature

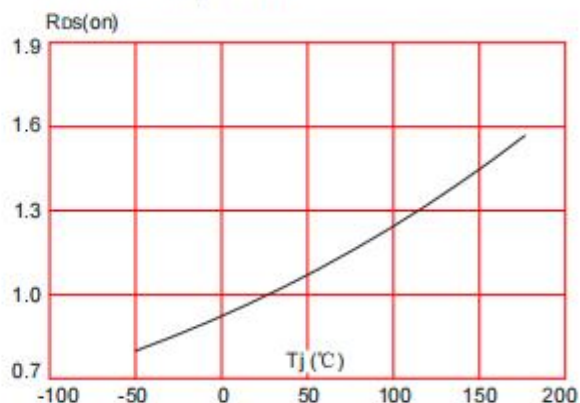


Figure 9: Maximum Safe Operating Area

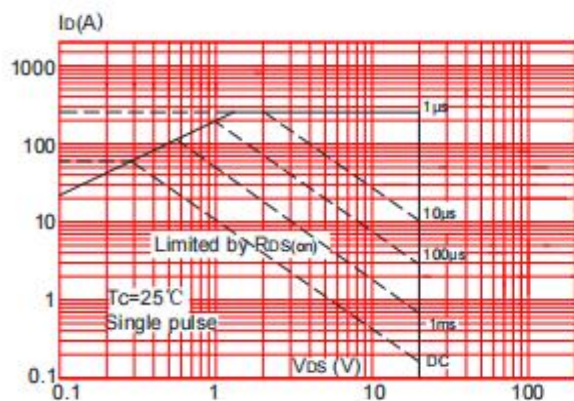


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

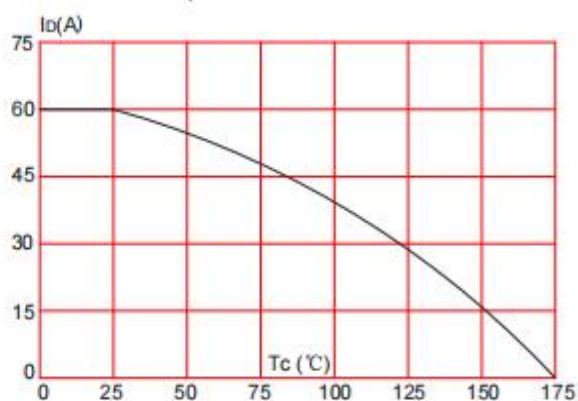
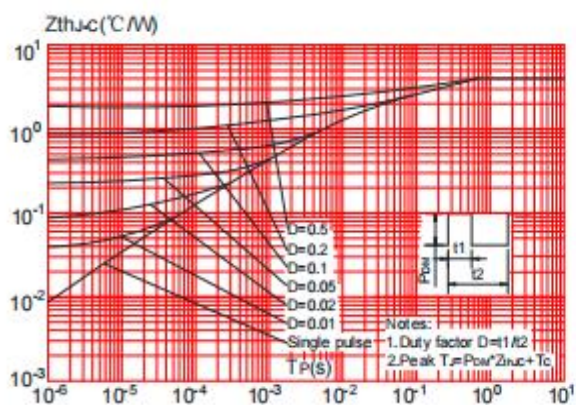
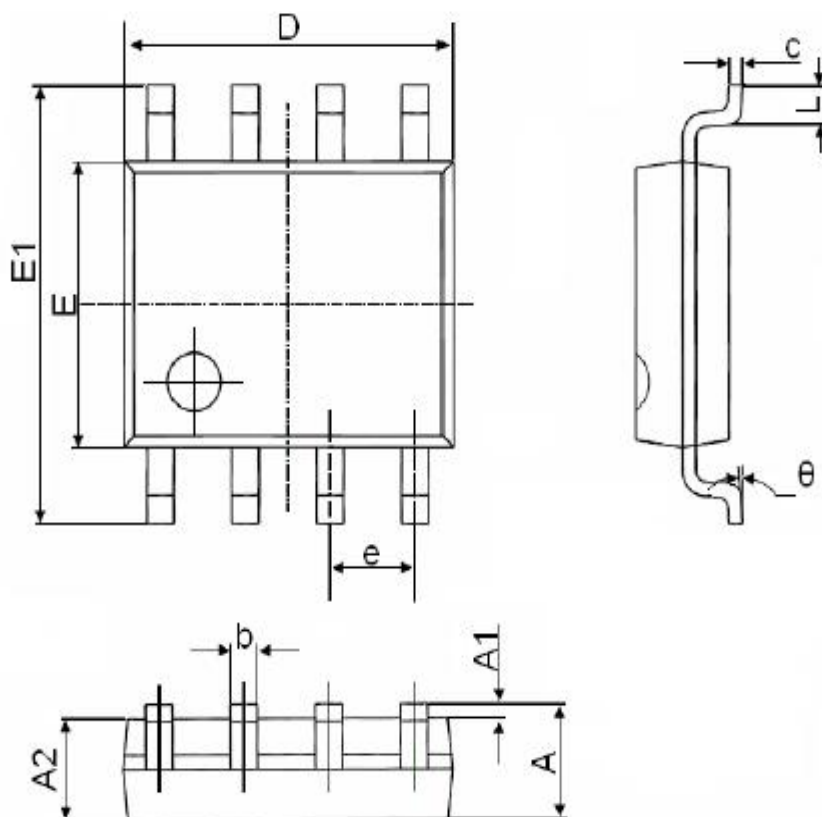


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



Package Mechanical Data SOP-8


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



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