

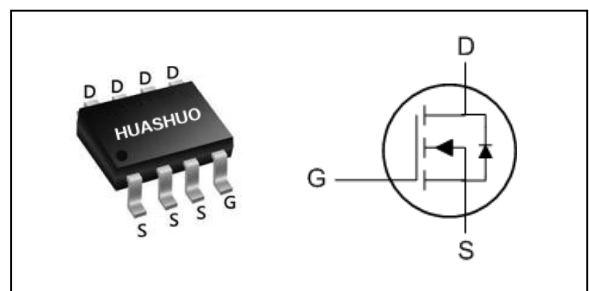
**N-Ch 100V Fast Switching MOSFETs**
**Description**

The HSM0094 is the high cell density trench N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the Synchronous Rectification for AC/DC Quick Charger.

- ★ 100% EAS Guaranteed
- ★ Low  $R_{DS(ON)}$
- ★ Low Gate Charge
- ★ RoHs and Halogen-Free Compliant

**Product Summary**

$V_{DS}$	100	V
$R_{DS(ON),max}$	12	m $\Omega$
$I_D$	11.5	A

**SOP8 Pin Configuration**

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_A=25^\circ C$	Continuous Drain Current <sup>1</sup>	11.5	A
$I_D@T_A=70^\circ C$	Continuous Drain Current <sup>1</sup>	9	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	46	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	12	mJ
$I_{AS}$	Avalanche Current	9	A
$P_D@T_A=25^\circ C$	Total Power Dissipation <sup>4</sup>	3.1	W
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$

**Thermal Data**

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup> ( $t \leq 10s$ )	---	40	$^\circ C/W$
	Thermal Resistance Junction-Ambient <sup>1</sup>	---	75	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	---	24	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=11.5A$	---	9	12	$m\Omega$
	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=4.5V, I_D=9.5A$	---	12	15.5	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	---	2.3	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=80V, V_{GS}=0V, T_J=25^\circ C$	---	---	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=55^\circ C$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
gfs	Forward Transconductance	$V_{DS}=5V, I_D=11.5A$	---	45	---	S
Qg	Total Gate Charge (10V)	$V_{DS}=50V, V_{GS}=10V, I_D=11.5A$	---	35	---	nC
Qg	Total Gate Charge (4.5V)		---	16	---	
Qgs	Gate-Source Charge		---	8	---	
Qgd	Gate-Drain Charge		---	4	---	
Td(on)	Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_G=3\Omega, I_D=11.5A$	---	9	---	ns
Tr	Rise Time		---	4.5	---	
Td(off)	Turn-Off Delay Time		---	35	---	
Tf	Fall Time		---	5.5	---	
Ciss	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	---	2550	---	pF
Coss	Output Capacitance		---	305	---	
Crss	Reverse Transfer Capacitance		---	12	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V, \text{Force Current}$	---	---	4	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	---	---	1.1	V
$t_{rr}$	Reverse Recovery Time	$I_F=11.5A, di/dt=100A/\mu s,$	---	28	---	nS
$Q_{rr}$	Reverse Recovery Charge	$T_J=25^\circ C$	---	120	---	nC

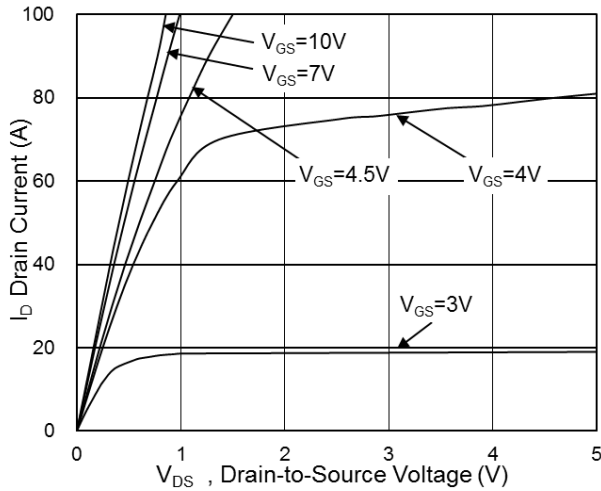
Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.3mH, I_{AS}=9A$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.

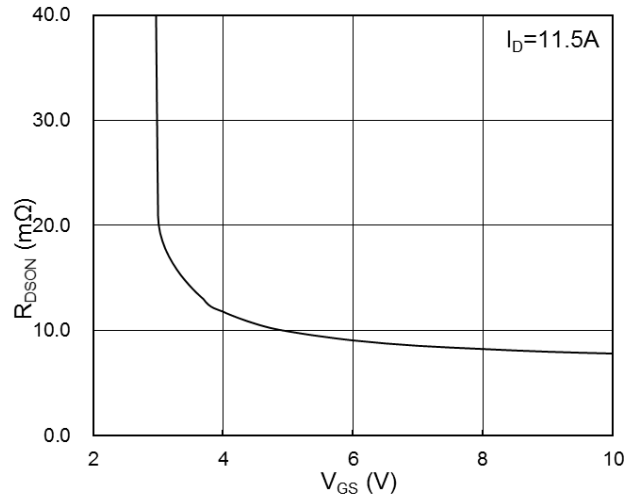


**N-Ch 100V Fast Switching MOSFETs**

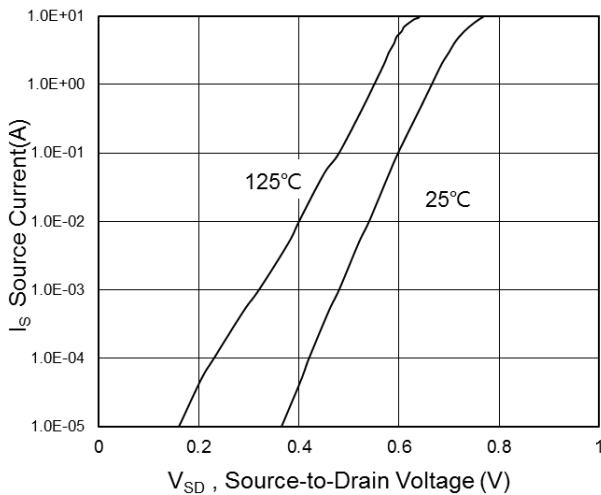
**Typical Characteristics**



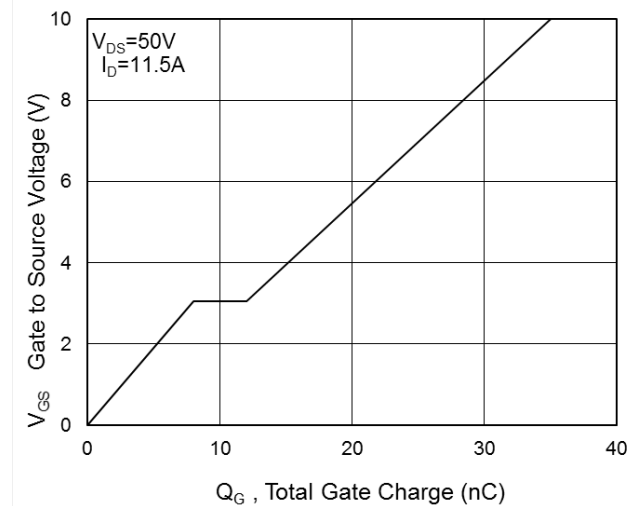
**Fig.1 Typical Output Characteristics**



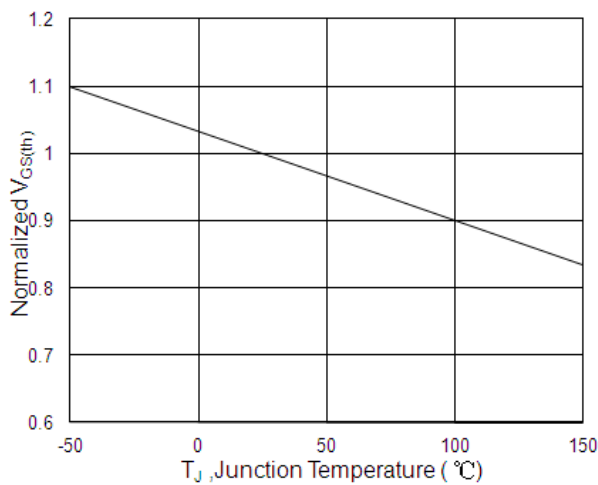
**Fig.2 On-Resistance vs. G-S Voltage**



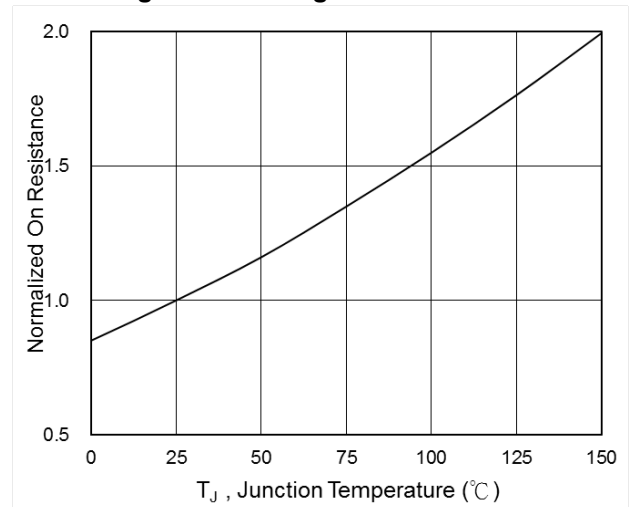
**Fig.3 Source-Drain Forward Characteristics**



**Fig.4 Gate-Charge Characteristics**



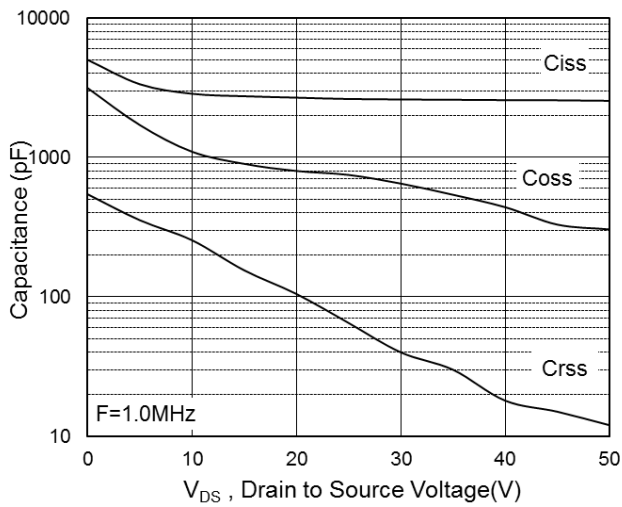
**Fig.5 Normalized  $V_{GS(th)}$  vs.  $T_J$**



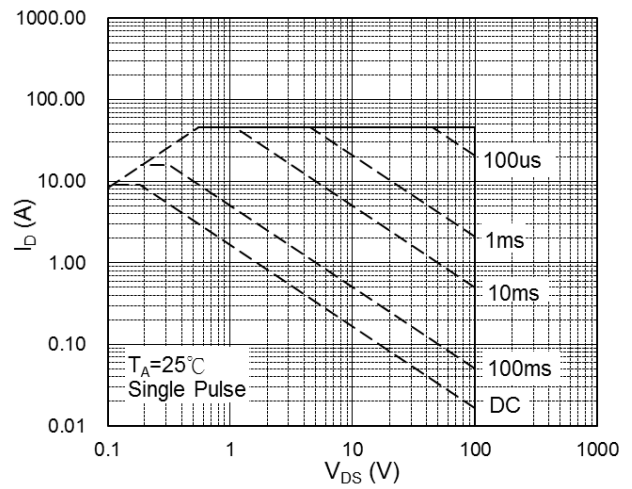
**Fig.6 Normalized  $R_{DS(on)}$  vs.  $T_J$**



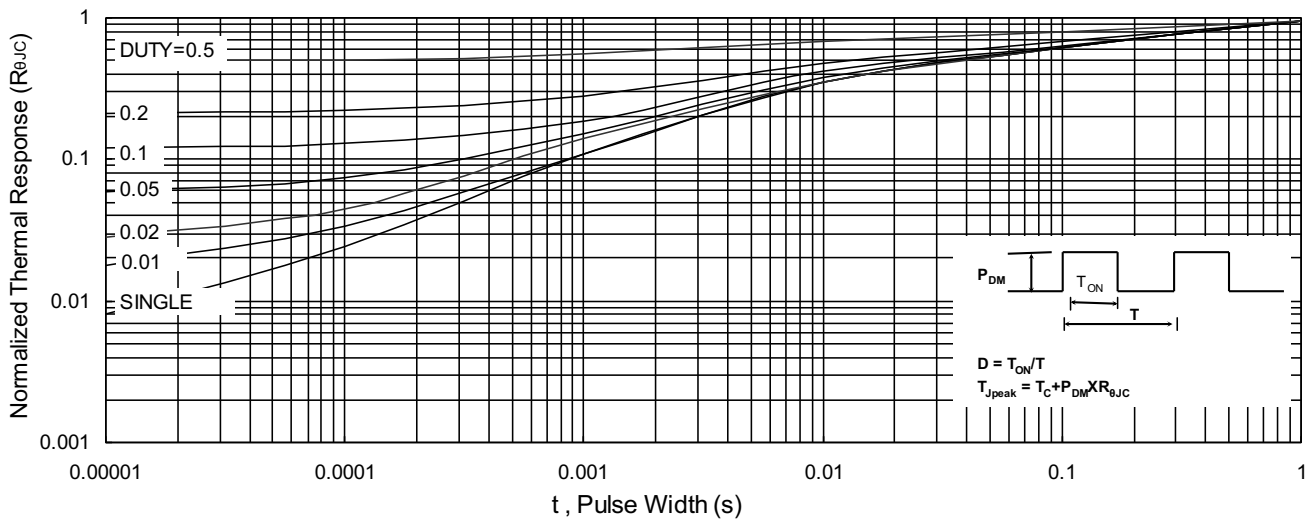
**N-Ch 100V Fast Switching MOSFETs**



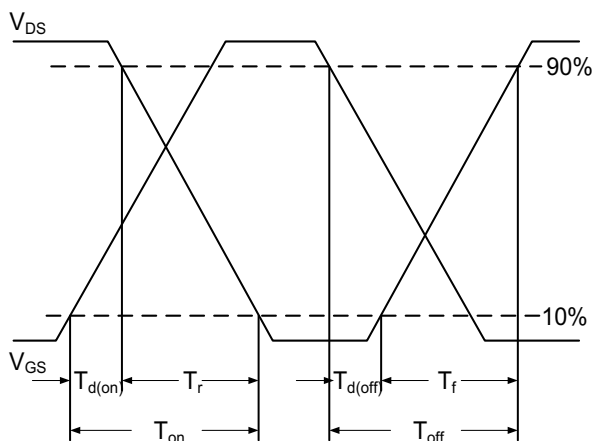
**Fig.7 Capacitance**



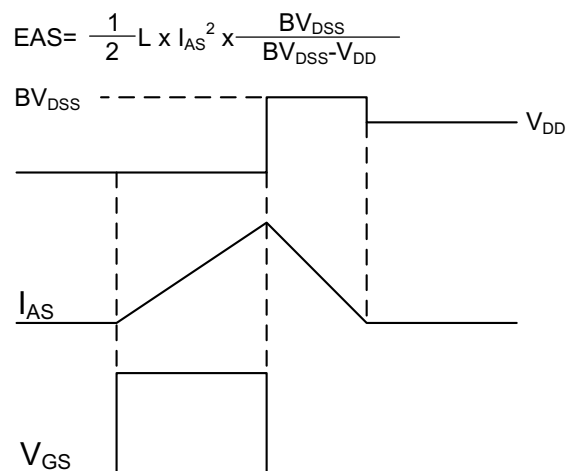
**Fig.8 Safe Operating Area**



**Fig.9 Normalized Maximum Transient Thermal Impedance**



**Fig.10 Switching Time Waveform**

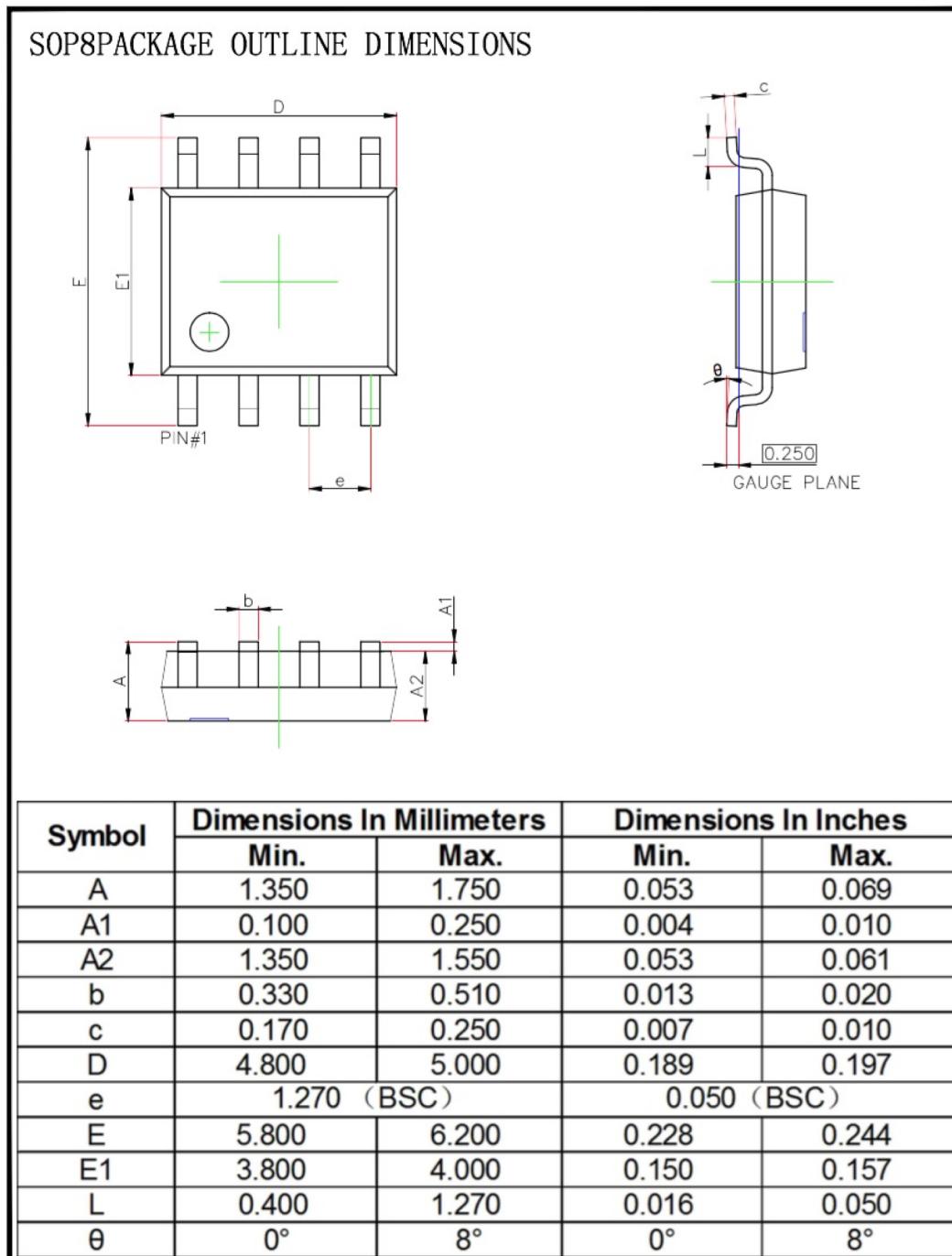


**Fig.11 Unclamped Inductive Switching Waveform**



## Ordering Information

Part Number	Package code	Packaging
HSM0094	SOP-8	2500/Tape&Reel



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