

## N-Channel Enhancement Mode Power MOSFET

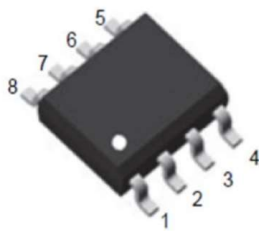
### Features

- $V_{DS} = 40V$ ,  $I_D = 14 A$   
 $R_{DS(ON)} < 10 m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 17 m\Omega @ V_{GS} = 4.5V$

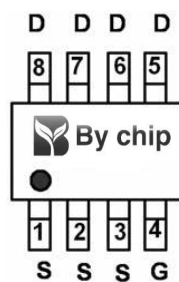
### General Features

- Advanced Trench Technology
- Provide Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free and Green Available

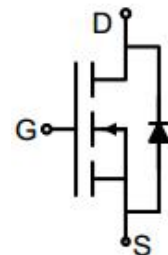
100% UIS TESTED!  
 100%  $\Delta V_{ds}$  TESTED!



SOP-8



pin assignment



Schematic diagram

### Maximum ratings, at $T_A = 25^\circ C$ , unless otherwise specified

Symbol	Parameter	Rating	Unit
$V_{(BR)DSS}$	Drain-Source breakdown voltage	40	V
$V_{GS}$	Gate-Source voltage	$\pm 20$	V
$I_S$	Diode continuous forward current	$T_A = 25^\circ C$	3.8 A
$I_D$	Continuous drain current @ $V_{GS} = 10V$	$T_A = 25^\circ C$	14 A
		$T_A = 100^\circ C$	9 A
$I_{DM}$	Pulse drain current tested ①	$T_A = 25^\circ C$	56 A
$P_D$	Maximum power dissipation	$T_A = 25^\circ C$	3.1 W
MSL		Level 3	
$T_{STG}, T_J$	Storage and junction temperature range	-55 to 150	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Typical	Unit
$R_{\theta JL}$	Thermal Resistance, Junction-to-Lead	24	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	40	$^\circ C/W$

**Electrical Characteristics**

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
<b>Static Electrical Characteristics @ T<sub>j</sub>=25°C (unless otherwise stated)</b>						
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	40	--	--	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V	--	--	1	μA
	Zero Gate Voltage Drain Current(T <sub>j</sub> =125°C)	V <sub>DS</sub> =40V, V <sub>GS</sub> =0V	--	--	100	μA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
V <sub>GS(TH)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0		3.0	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>②</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A	--		10	mΩ
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance <sup>②</sup>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A	--		17	mΩ
<b>Dynamic Electrical Characteristics @ T<sub>j</sub> = 25°C (unless otherwise stated)</b>						
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz	1115	1315	1515	pF
C <sub>oss</sub>	Output Capacitance		85	100	115	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		65	80	95	pF
R <sub>g</sub>	Gate Resistance	f=1MHz	--	1.7	--	Ω
Q <sub>g</sub> (10V)	Total Gate Charge	V <sub>DS</sub> =20V, I <sub>D</sub> =10A, V <sub>GS</sub> =10V	--	22	--	nC
Q <sub>g</sub> (4.5V)	Total Gate Charge		--	12	--	nC
Q <sub>gs</sub>	Gate-Source Charge		--	4.5	--	nC
Q <sub>gd</sub>	Gate-Drain Charge		--	4.2	--	nC
<b>Switching Characteristics</b>						
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DD</sub> =20V, I <sub>D</sub> =10A, R <sub>G</sub> =3.0Ω, V <sub>GS</sub> =10V	--	7.5	--	ns
t <sub>r</sub>	Turn-on Rise Time		--	3.8	--	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		--	24	--	ns
t <sub>f</sub>	Turn-Off Fall Time		--	5.5	--	ns
<b>Source- Drain Diode Characteristics@ T<sub>j</sub> = 25°C (unless otherwise stated)</b>						
V <sub>SD</sub>	Forward on voltage	I <sub>SD</sub> =10A, V <sub>GS</sub> =0V	--	0.8	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	T <sub>j</sub> =25°C, I <sub>sd</sub> =10A, V <sub>GS</sub> =0V	--	8.5	--	ns
Q <sub>rr</sub>	Reverse Recovery Charge	di/dt=500A/μs	--	8	--	nC

**NOTE:**

- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Pulse width ≤ 300μs; duty cycle ≤ 2%.

Typical Characteristics

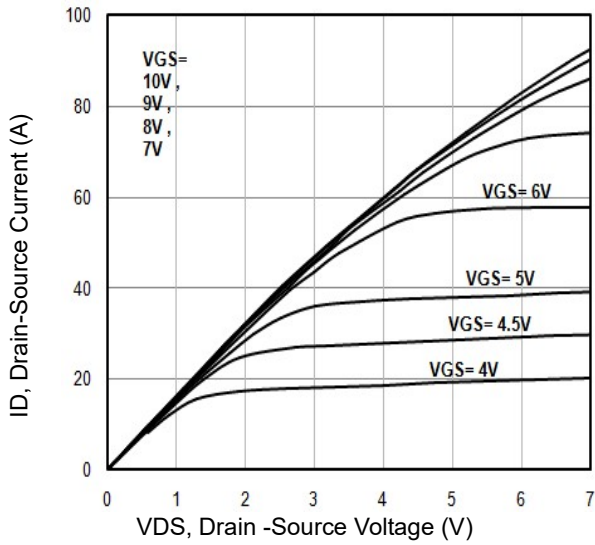


Fig1. Typical Output Characteristics

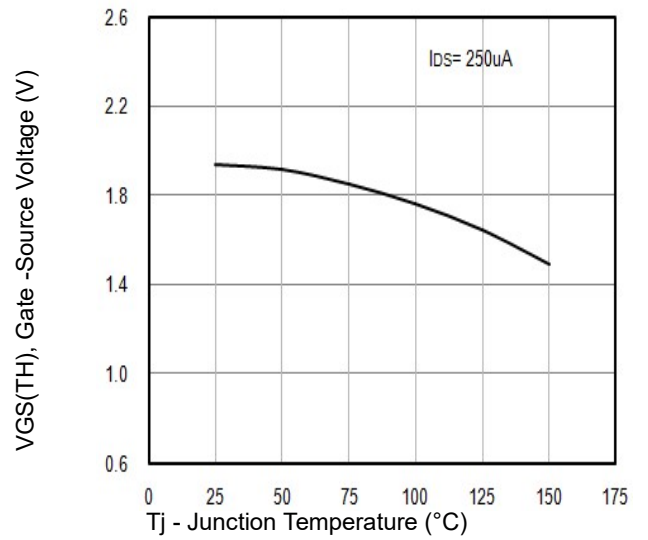


Fig2.  $V_{GS(TH)}$  Gate -Source Voltage Vs.  $T_j$

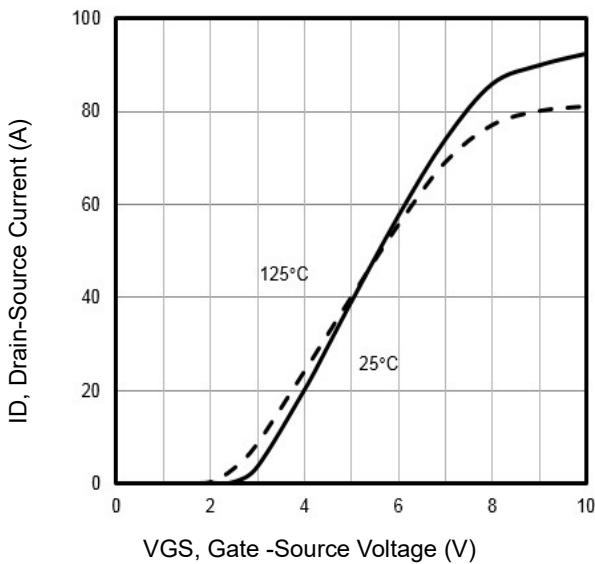


Fig3. Typical Transfer Characteristics

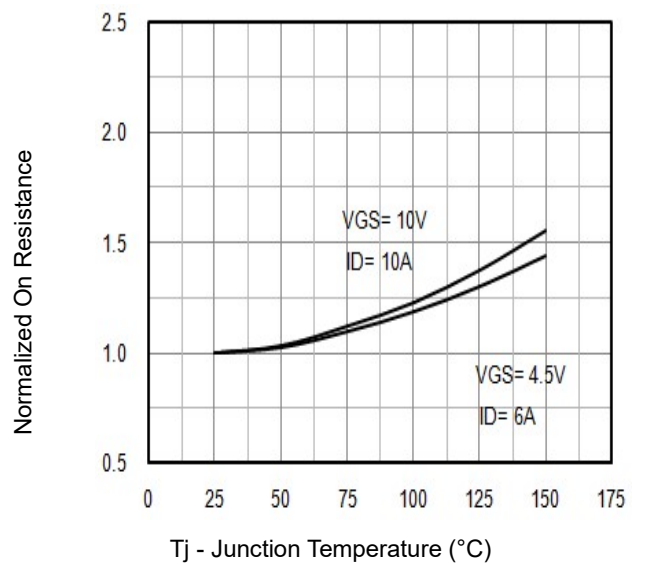


Fig4. Normalized On-Resistance Vs.  $T_j$

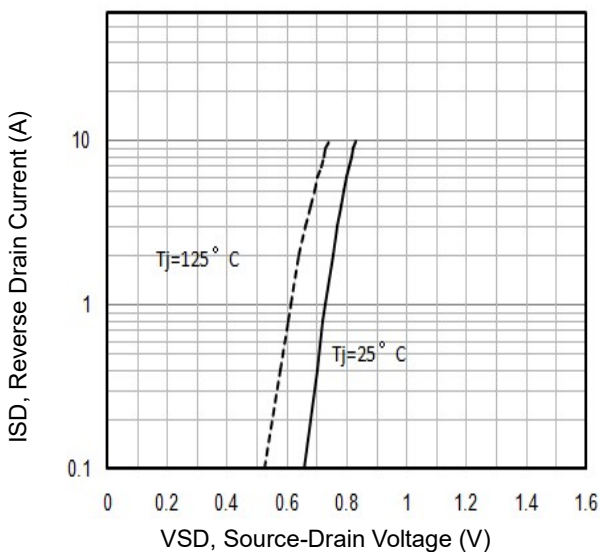


Fig5. Typical Source-Drain Diode Forward Voltage

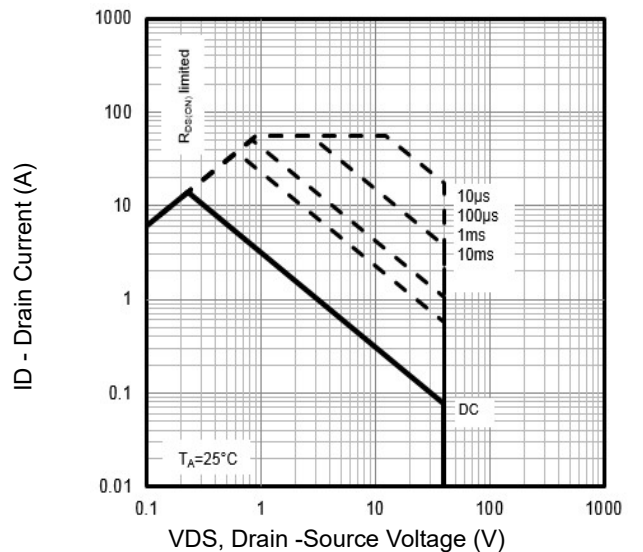


Fig6. Maximum Safe Operating Area

Typical Characteristics

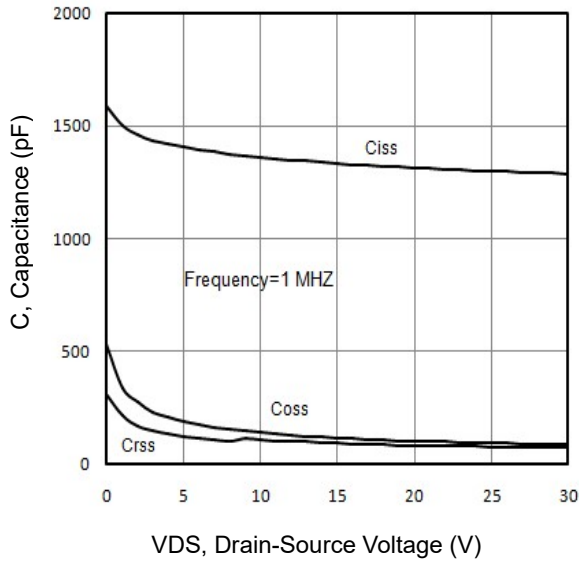


Fig7. Typical Capacitance Vs. Drain-Source Voltage

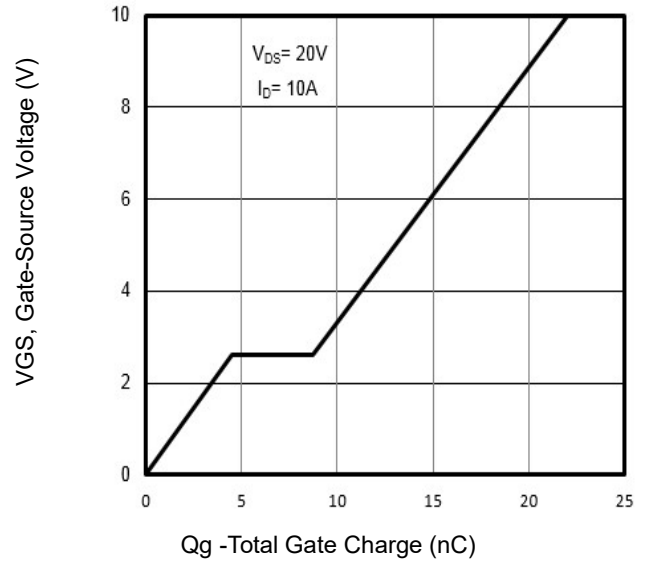


Fig8. Typical Gate Charge Vs. Gate-Source Voltage

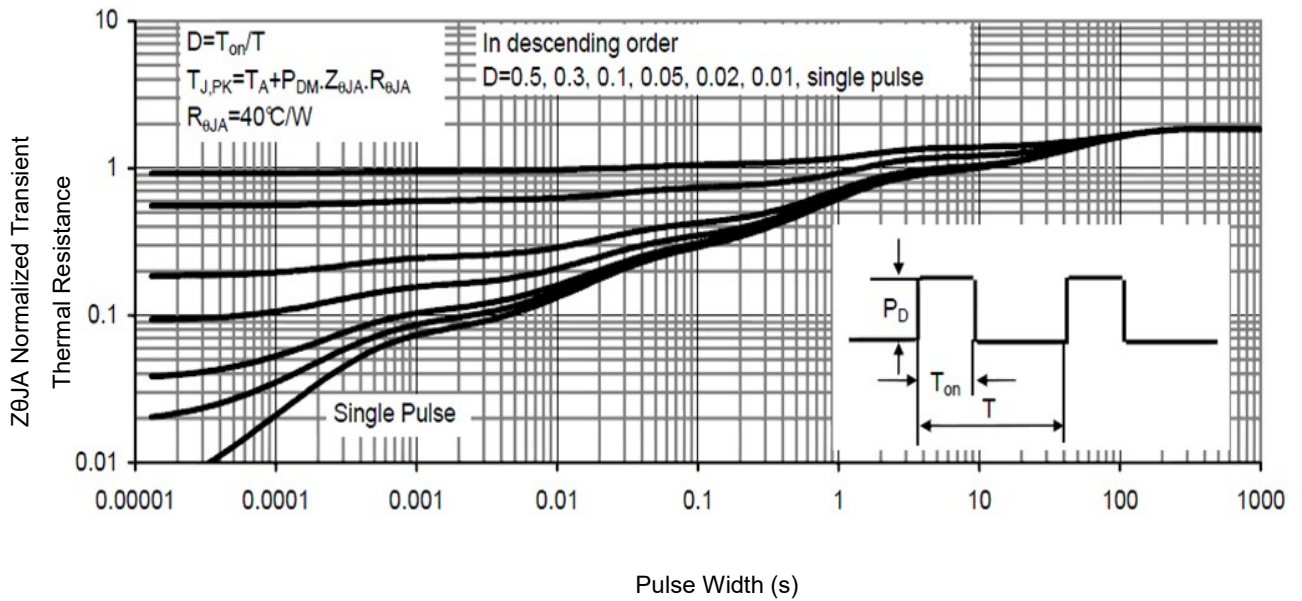


Fig9. Normalized Maximum Transient Thermal Impedance

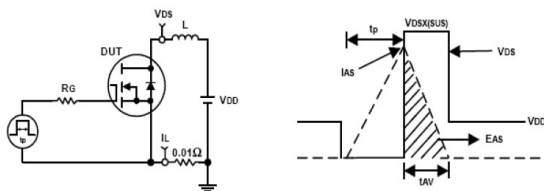


Fig10. Unclamped Inductive Test Circuit and waveforms

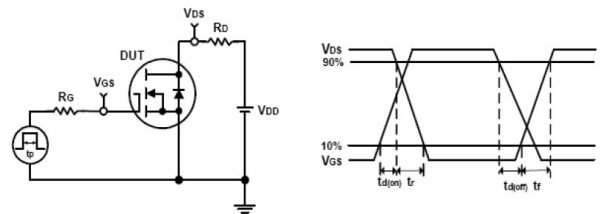


Fig11. Switching Time Test Circuit and waveforms