

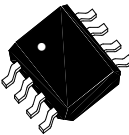


**N-Channel Enhancement-Mode MOSFET (30V, 10A)**

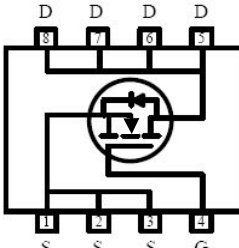
PRODUCT SUMMARY		
$V_{DS}$	$I_D$	$R_{DS(on)}$ (m-ohm) Max
30V	10A	13.5 @ $V_{GS} = 10V, I_D=10A$
		20 @ $V_{GS} = 4.5V, I_D=5A$

**Features**

- Advanced Trench Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Lead free product is acquired
- Surface mount Package



**SOP-8**



Pin 1 / 2 / 3: Source  
 Pin 4: Gate  
 Pin 5 / 6 / 7 / 8: Drain

**Absolute Maximum Ratings** ( $T_A=25^{\circ}C$ , unless otherwise noted)

Symbol	Parameter	Ratings	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current @ $T_A=25^{\circ}C$	10	A
$I_{DM}$	Drain Current (Pulsed) <sup>a</sup>	50	A
$P_D$	Total Power Dissipation @ $T_A=25^{\circ}C$	2.5	W
$T_j, T_{stg}$	Operating Junction and Storage Temperature Range	-55 to +150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	50	$^{\circ}C/W$

a: Repetitive Rating: Pulse width limited by the maximum junction temperature.  
 b: 1-in<sup>2</sup> 2oz Cu PCB board



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

Symbol	Characteristic	Test Conditions	Min.	Typ.	Max.	Unit
<b>• Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=24V, V_{GS}=0V$	-	-	50	nA
$I_{GSS}$		Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$
<b>• On Characteristics<sup>c</sup></b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	-	2.5	V
$R_{DS(on)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=10A$	-	-	13.5	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	-	-	20	
$g_{FS}$	Forward Transconductance	$V_{DS}=10V, I_D=9A$	-	9	-	S
<b>• Dynamic Characteristics<sup>d</sup></b>						
$C_{iss}$	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1MHz$	-	710	1350	pF
$C_{oss}$	Output Capacitance		-	155	-	
$C_{rss}$	Reverse Transfer Capacitance		-	145	-	
$R_g$	Gate resistance	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	-	2	3	$\Omega$
<b>• Switching Characteristics<sup>d</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=20V, I_D=9A, V_{GS}=4.5V$	-	8	-	nC
$Q_{gs}$	Gate-Source Charge		-	3.3	-	
$Q_{gd}$	Gate-Drain Charge		-	2.7	-	
$t_{d(on)}$	Turn-on Delay Time	$V_{GS}=10V, V_{DS}=15V, I_D=9A, R_L=15\Omega, R_{GEN}=3.3\Omega$	-	7	-	nS
$t_r$	Turn-on Rise Time		-	7	-	
$t_{d(off)}$	Turn-off Delay Time		-	22	-	
$t_f$	Turn-off Fall Time		-	7	-	
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=9A, di/dt=100A/\mu S$	-	24	-	nS
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=9A, di/dt=100A/\mu S$	-	14	-	nC
<b>• Drain-Source Diode Characteristics</b>						
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS}=0V, I_S=2.1A$	-	-	1.2	V

Note: Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$



Characteristics Curve

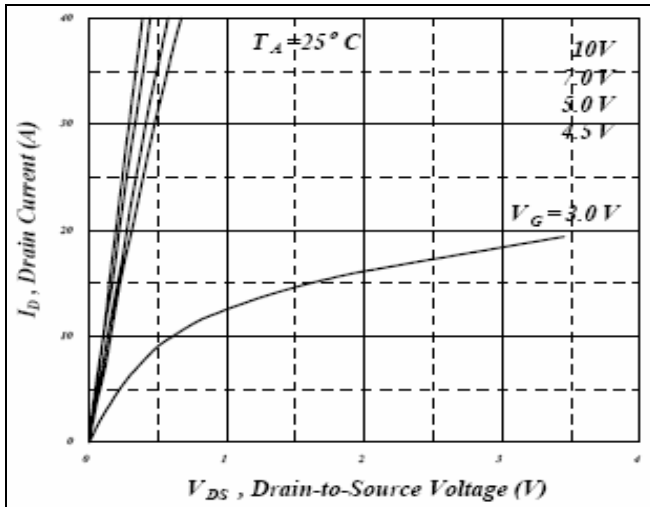


Fig 1. Typical Output Characteristics

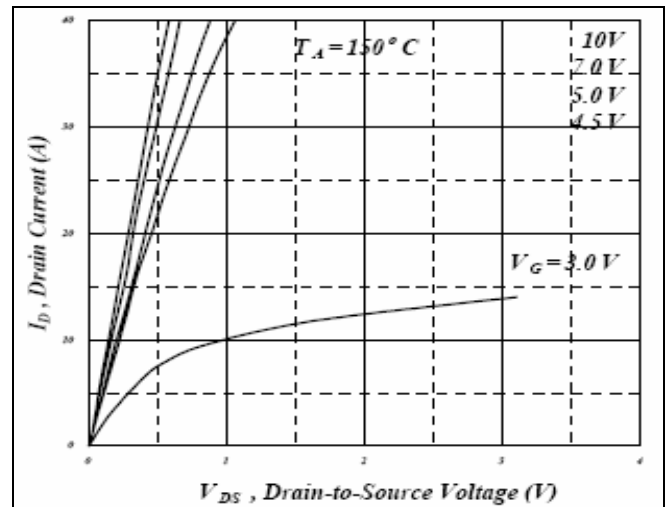


Fig 2. Typical Output Characteristics

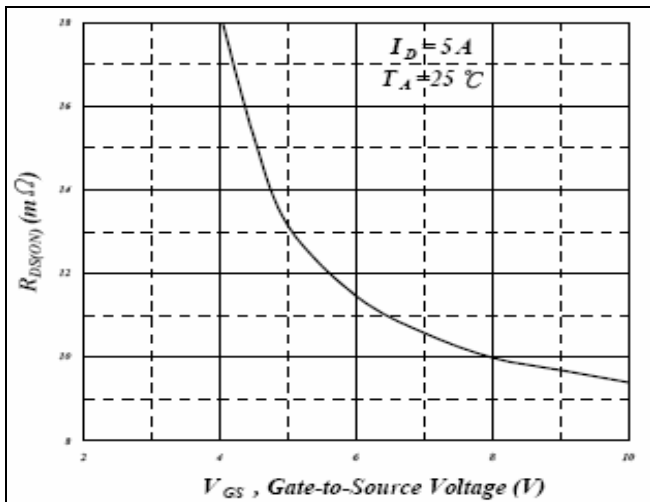


Fig 3. On-Resistance v.s. Gate Voltage

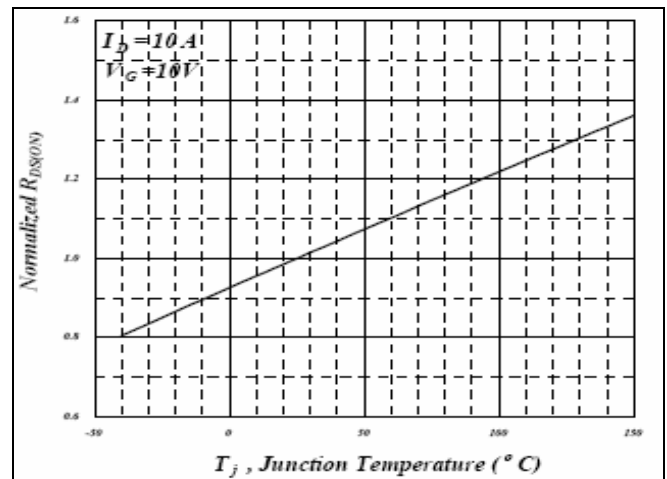


Fig 4. Normalized On-Resistance v.s. Junction Temperature

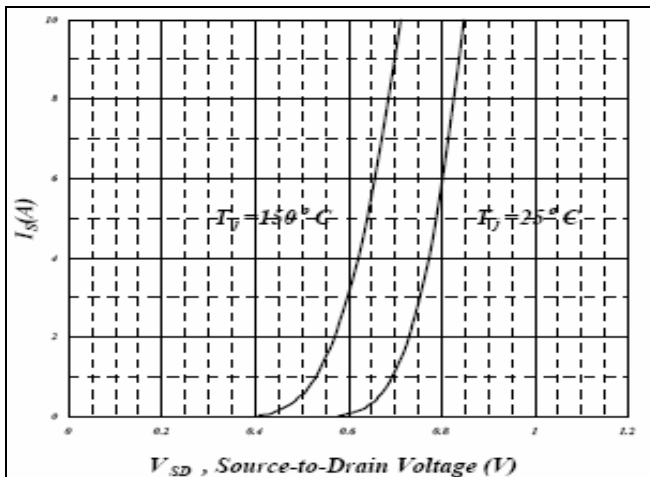


Fig 5. Forward Characteristic of Reverse Diode

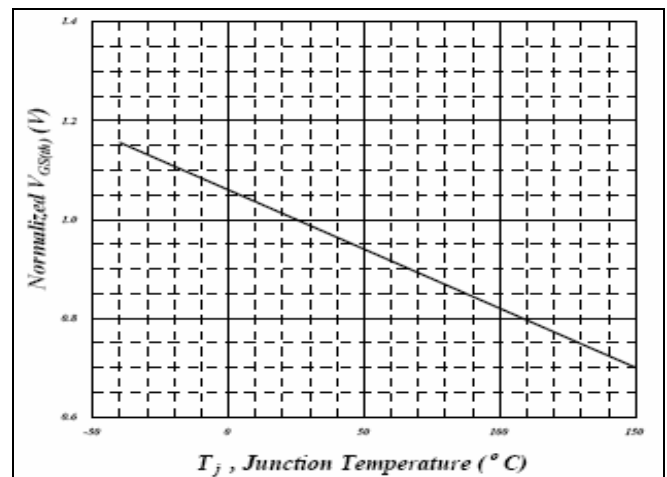


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

Characteristics Curve

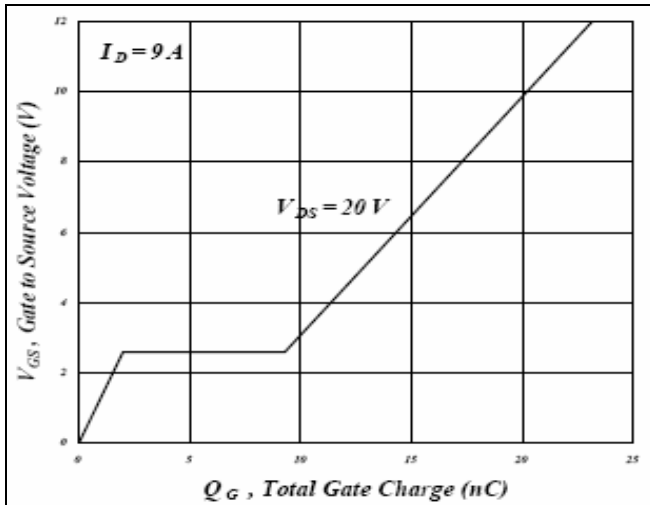


Fig 7. Gate Charge Characteristics

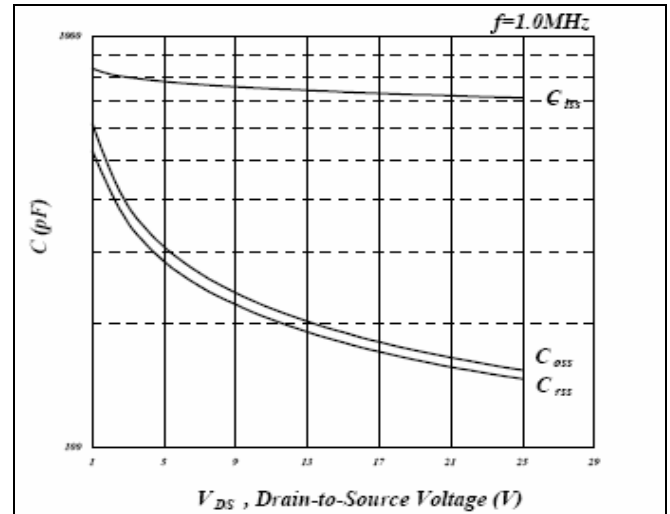


Fig 8. Typical Capacitance Characteristics

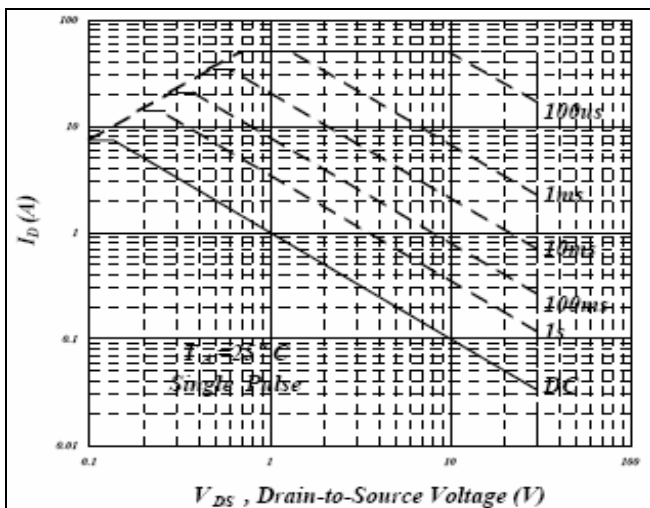


Fig 9. Maximum Safe Operating Area

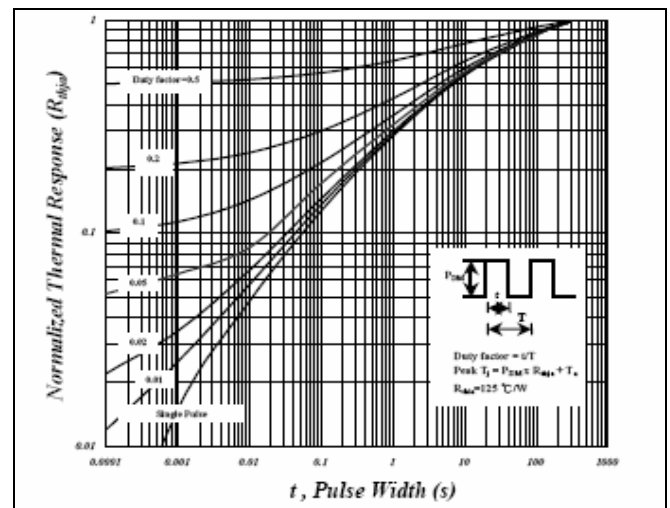


Fig 10. Effective Transient Thermal Impedance

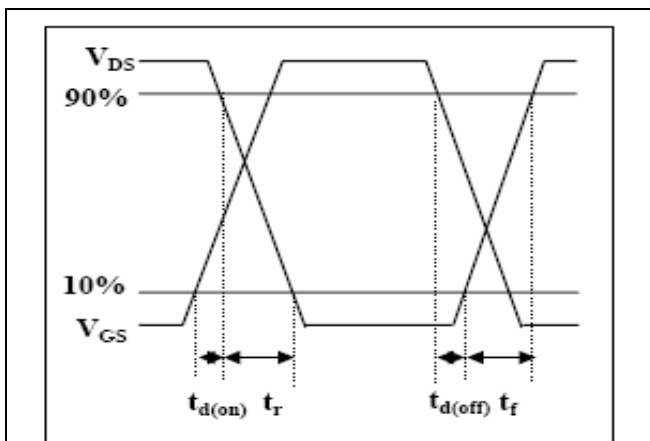


Fig 11. Switching Time Waveform

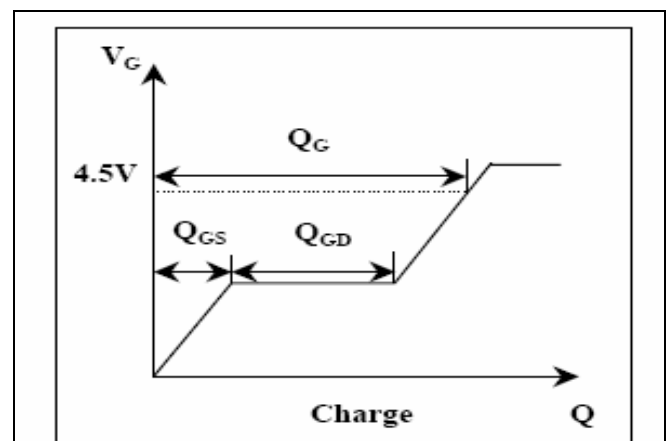


Fig 12. Gate Charge Waveform