

## N-channel Enhancement Mode Power MOSFET

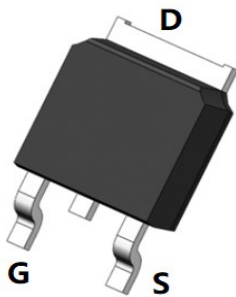
### Features

- $V_{DS} = 150V$ ,  $I_D = 20 A$   
 $R_{DS(ON)} < 70 m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 80 m\Omega @ V_{GS} = 4.5V$

### General Features

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

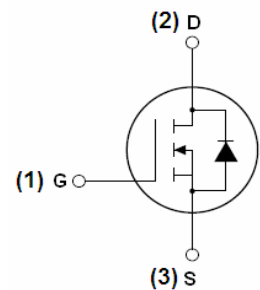
100% UIS TESTED!  
 100%  $\Delta V_{ds}$  TESTED!



TO-252-2L Top View



Pin Assignment



Schematic Diagram

### Absolute Maximum Ratings ( $T_C = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	150	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current-Continuous	20	A
$I_D(100^\circ C)$	Drain Current-Continuous( $T_C = 100^\circ C$ )	14	A
$I_{DM}$	Pulsed Drain Current	40	A
$P_D$	Maximum Power Dissipation	90	W
	Derating factor	0.6	W/ $^\circ C$
$E_{AS}$	Single pulse avalanche energy <sup>(Note 5)</sup>	80	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 175	$^\circ C$

### Thermal Characteristic

$R_{\theta JC}$	Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup>	1.7	$^\circ C/W$
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**Electrical Characteristics ( $T_C=25^{\circ}\text{C}$  unless otherwise noted)**

Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	150	165	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=150V, V_{GS}=0V$	-	-	1	$\mu A$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	$\pm 100$	nA
<b>On Characteristics (Note 3)</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
$R_{DS(ON)}$	Drain-Source On-State Resistance	$V_{GS}=10V, I_D=10A$	-		70	m $\Omega$
		$V_{GS}=7V, I_D=10A$			80	
$g_{FS}$	Forward Transconductance	$V_{DS}=5V, I_D=10A$	-	20	-	S
<b>Dynamic Characteristics (Note 4)</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=75V, V_{GS}=0V,$ $F=1.0MHz$	-	1810	-	PF
$C_{oss}$	Output Capacitance		-	61	-	PF
$C_{riss}$	Reverse Transfer Capacitance		-	45	-	PF
<b>Switching Characteristics (Note 4)</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=75V, R_L=5\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$	-	15.5	-	nS
$t_r$	Turn-on Rise Time		-	8.5	-	nS
$t_{d(off)}$	Turn-Off Delay Time		-	19.5	-	nS
$t_f$	Turn-Off Fall Time		-	7	-	nS
$Q_g$	Total Gate Charge	$V_{DS}=75V, I_D=10A,$ $V_{GS}=10V$	-	45	-	nC
$Q_{gs}$	Gate-Source Charge		-	9	-	nC
$Q_{gd}$	Gate-Drain Charge		-	12	-	nC
<b>Drain-Source Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage (Note 3)	$V_{GS}=0V, I_S=20A$	-	-	1.2	V
$I_S$	Diode Forward Current (Note 2)	-	-	-	20	A
$t_{rr}$	Reverse Recovery Time	$T_J = 25^{\circ}\text{C}, I_F = 10A$ $di/dt = 100A/\mu s$ (Note 3)	-	32	-	nS
$Q_{rr}$	Reverse Recovery Charge		-	53	-	nC
$t_{on}$	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25\Omega$

Typical Electrical and Thermal Characteristics (Curves)

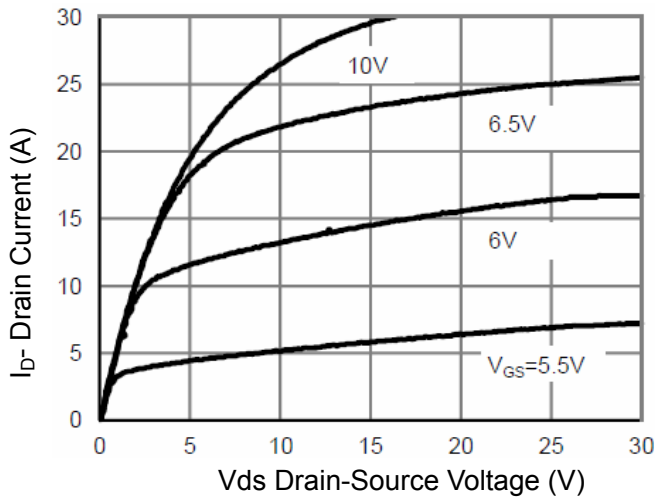


Figure 1 Output Characteristics

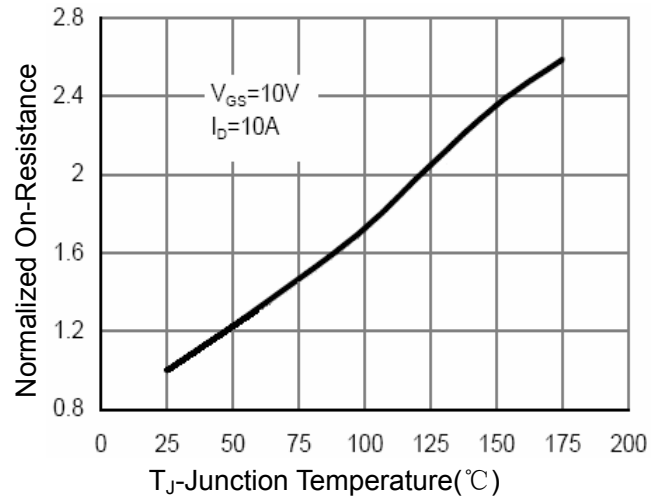


Figure 4 Rdson-Junction Temperature

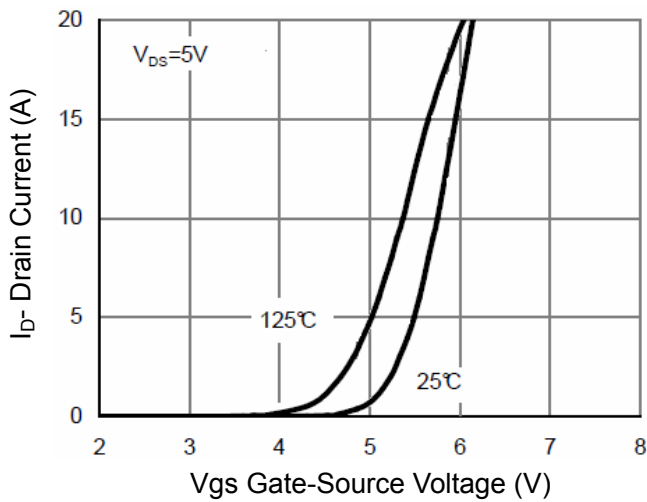


Figure 2 Transfer Characteristics

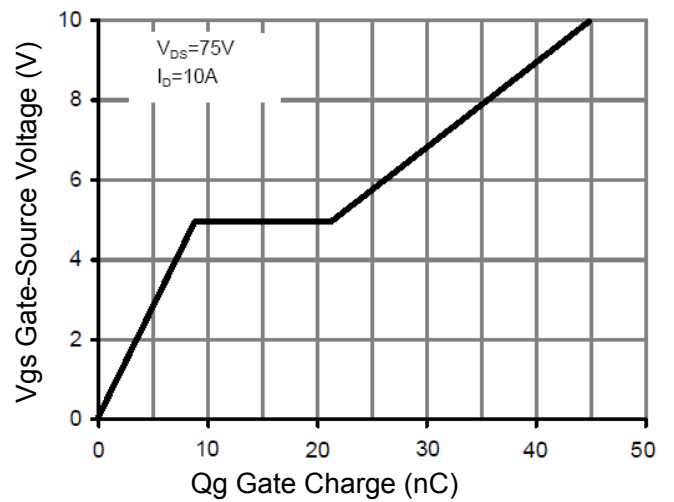


Figure 5 Gate Charge

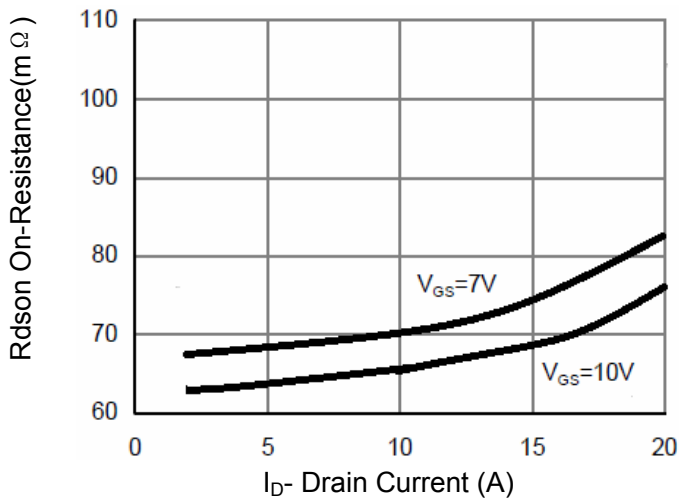


Figure 3 Rdson- Drain Current

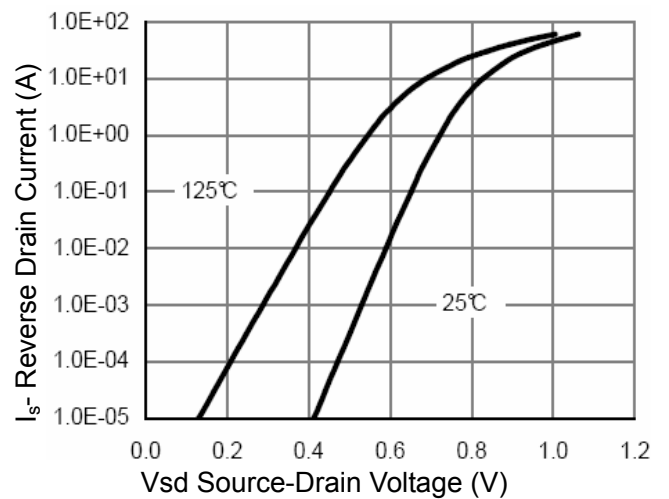


Figure 6 Source- Drain Diode Forward

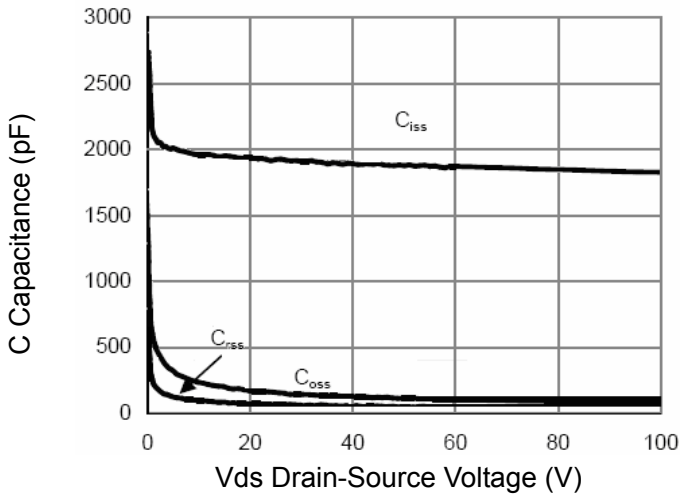


Figure 7 Capacitance vs Vds

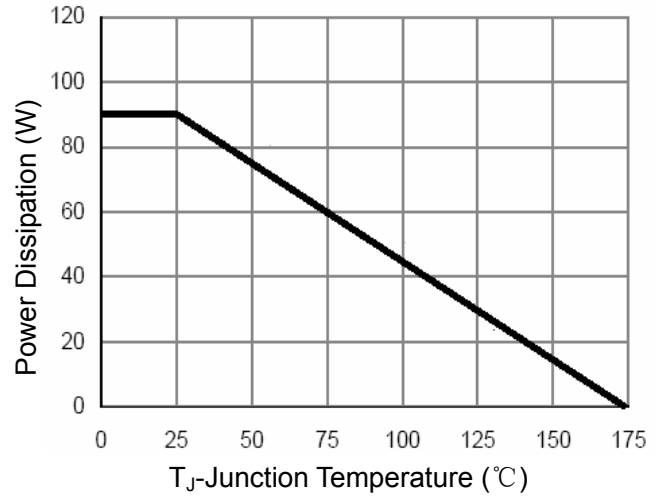


Figure 9 Power De-rating

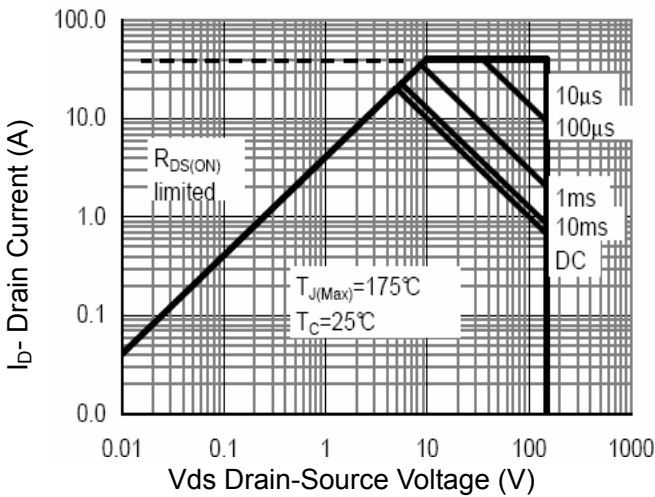


Figure 8 Safe Operation Area

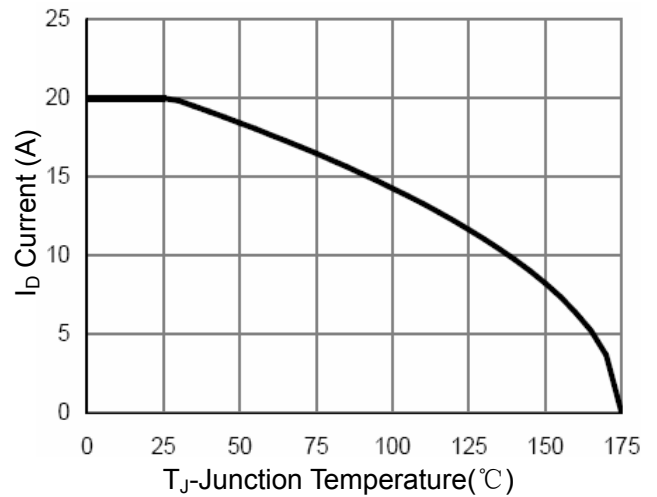


Figure 10 ID Current- Junction Temperature

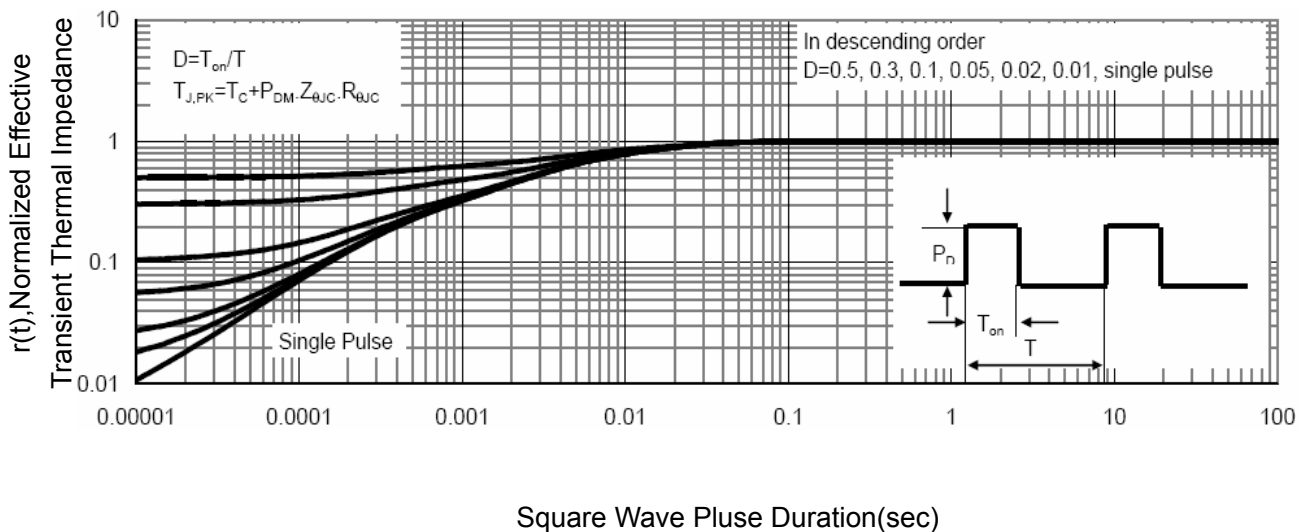


Figure 11 Normalized Maximum Transient Thermal Impedance