

N-channel Enhancement Mode Power MOSFET

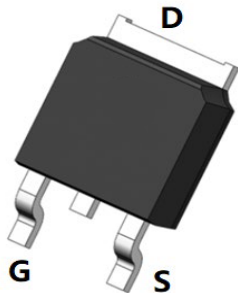
Features

- $V_{DS} = 60V$, $I_D = 50A$
 $R_{DS(ON)} < 12\text{ m}\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)} < 16\text{ m}\Omega$ @ $V_{GS} = 4.5V$

General Features

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

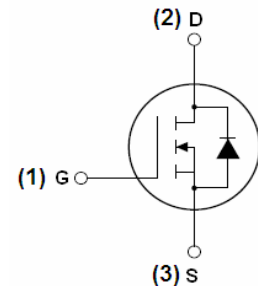
100% UIS TESTED!
 100% ΔV_{ds} TESTED!



TO-252-2L Top View



Pin Assignment



Schematic Diagram

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	I_D	50	A
Drain Current-Continuous($T_C = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	35.4	A
Pulsed Drain Current	I_{DM}	200	A
Maximum Power Dissipation	P_D	85	W
Derating factor		0.57	W/ $^\circ\text{C}$
Single pulse avalanche energy ^(Note 5)	E_{AS}	200	mJ
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 To 175	$^\circ\text{C}$

Thermal Characteristic

Thermal Resistance, Junction-to-Case ^(Note 2)	$R_{\theta JC}$	1.8	$^\circ\text{C/W}$
--	-----------------	-----	--------------------

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0		3.0	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	-	12		m Ω
		$V_{GS}=4.5V, I_D=20A$	-	16		m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=20A$	18	-	-	S
Dynamic Characteristics (Note 4)						
Input Capacitance	C_{iss}	$V_{DS}=30V, V_{GS}=0V,$ $F=1.0\text{MHz}$	-	1630	-	PF
Output Capacitance	C_{oss}		-	113	-	PF
Reverse Transfer Capacitance	C_{rss}		-	97	-	PF
Switching Characteristics (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, R_L=6.7\Omega$ $V_{GS}=5V, R_G=3\Omega$	-	15	-	nS
Turn-on Rise Time	t_r		-	20	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	120	-	nS
Turn-Off Fall Time	t_f		-	15.6	-	nS
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, R_L=6.7\Omega$ $V_{GS}=10V, R_G=3\Omega$	-	7.4	-	nS
Turn-on Rise Time	t_r		-	5.1	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	28.2	-	nS
Turn-Off Fall Time	t_f		-	5.5	-	nS
Total Gate Charge	Q_g	$V_{DS}=30V, I_D=20A,$ $V_{GS}=10V$	-	39		nC
Gate-Source Charge	Q_{gs}		-	7		nC
Gate-Drain Charge	Q_{gd}		-	8.5		nC
Drain-Source Diode Characteristics						
Diode Forward Voltage (Note 3)	V_{SD}	$V_{GS}=0V, I_S=20A$	-		1.2	V
Diode Forward Current (Note 2)	I_S		-	-	50	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}\text{C}, I_F = 20A$ $di/dt = 100A/\mu\text{s}$ (Note 3)	-	28	-	nS
Reverse Recovery Charge	Q_{rr}		-	40	-	nC
Forward Turn-On Time	t_{on}	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 $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5\text{mH}, R_G=25\Omega$

Typical Electrical and Thermal Characteristics (Curves)

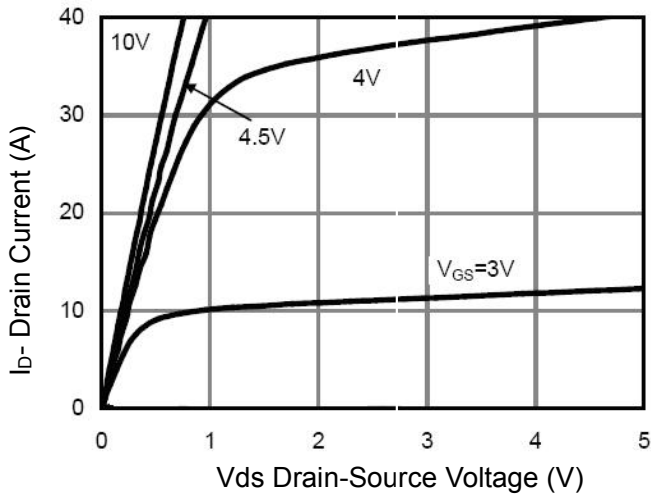


Figure 1 Output Characteristics

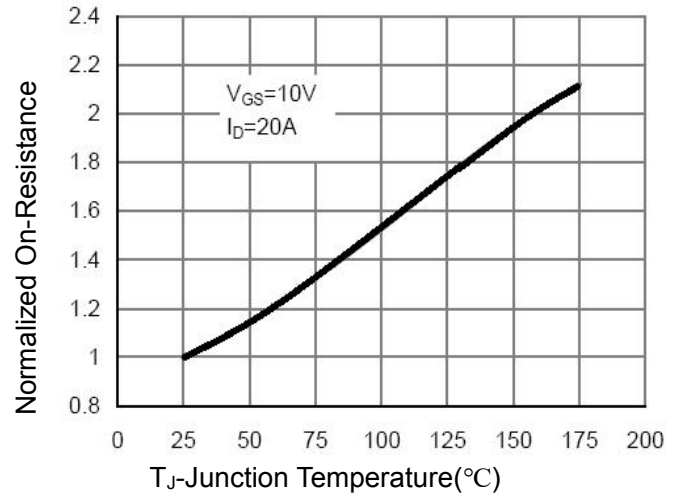


Figure 4 Rds(on)-Junction Temperature

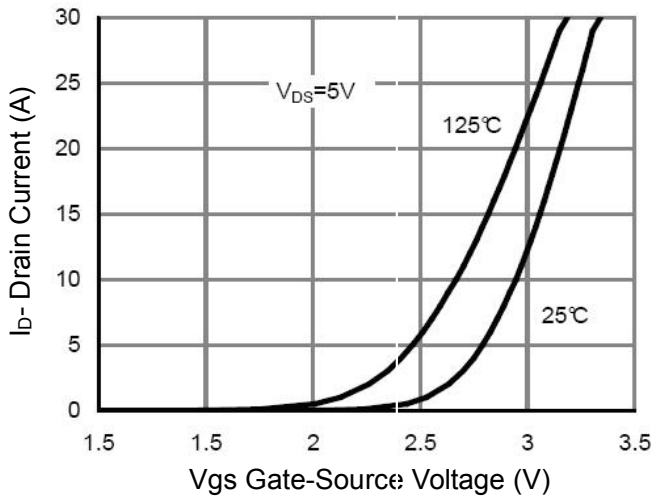


Figure 2 Transfer Characteristics

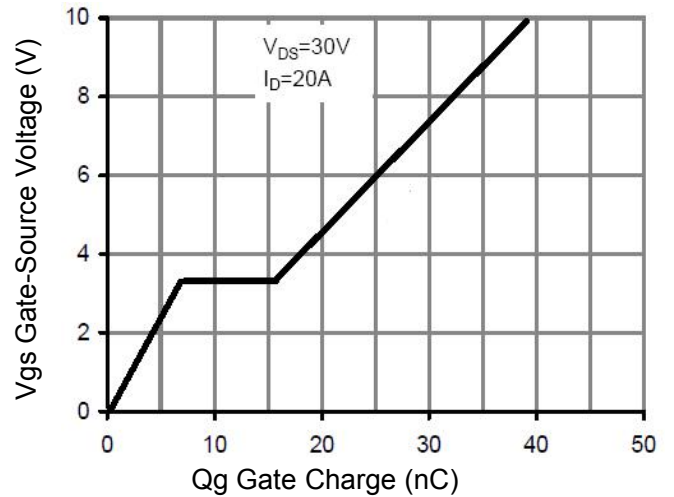


Figure 5 Gate Charge

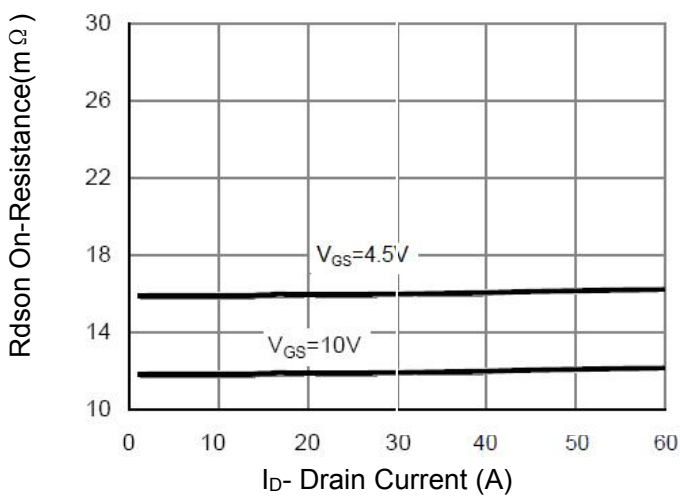


Figure 3 Rds(on)- Drain Current

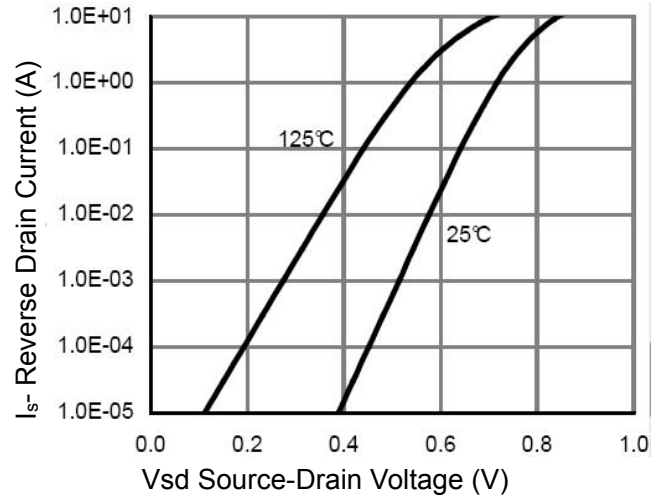


Figure 6 Source- Drain Diode Forward

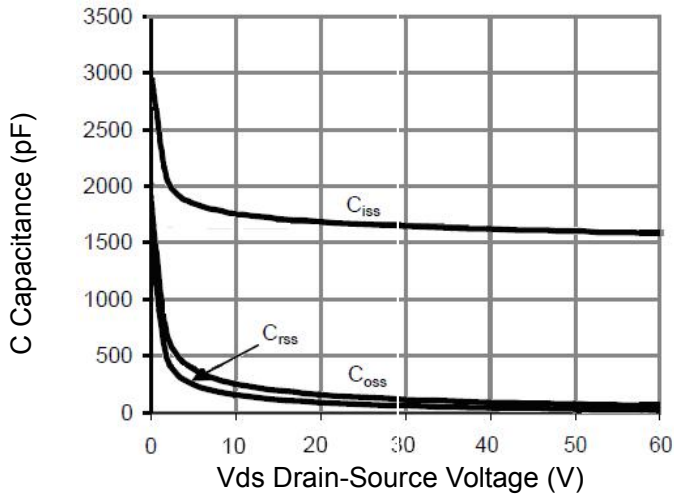


Figure 7 Capacitance vs Vds

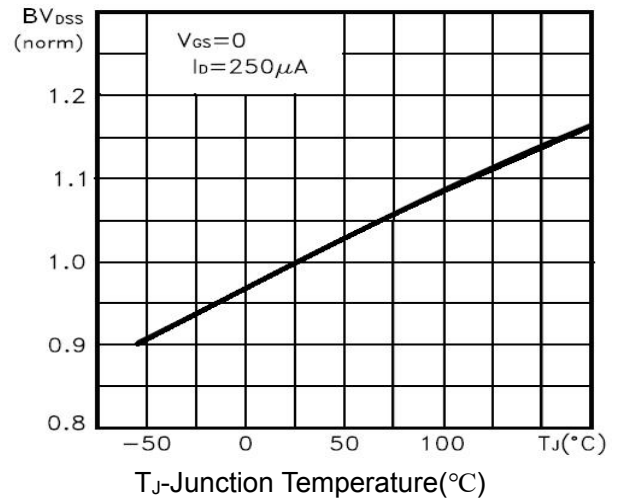


Figure 9 BV_{DSS} vs Junction Temperature

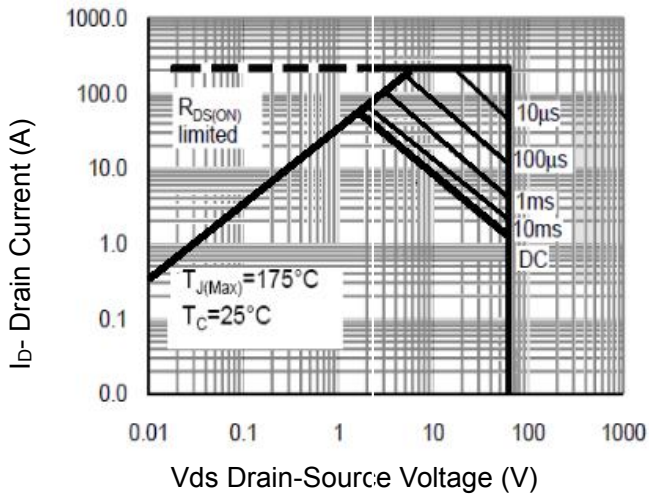


Figure 8 Safe Operation Area

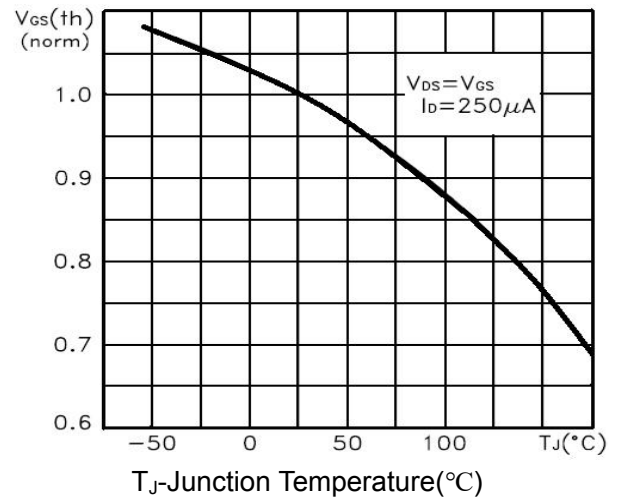


Figure 10 $V_{GS(th)}$ vs Junction Temperature

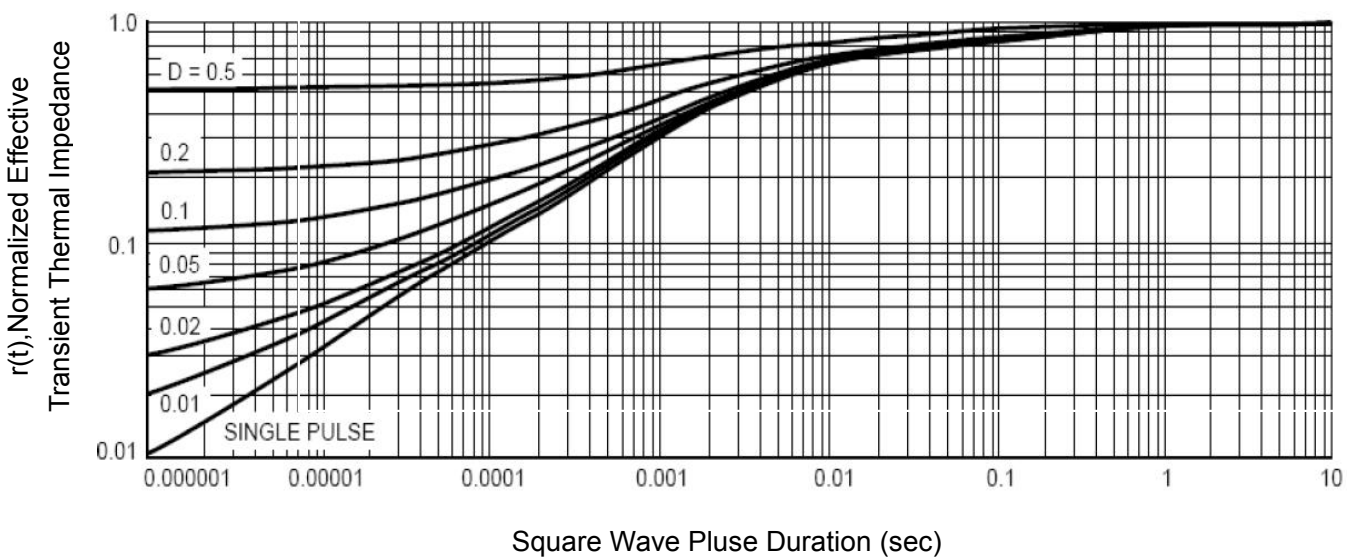


Figure 11 Normalized Maximum Transient Thermal Impedance