

N-channel Enhancement Mode Power MOSFET

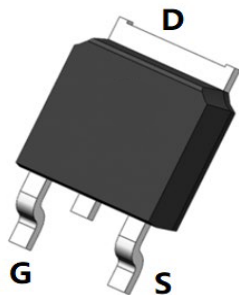
Features

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

General Features

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

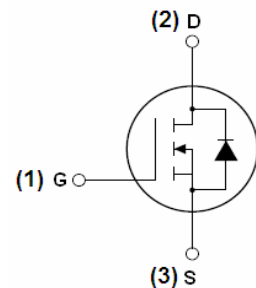
100% UIS TESTED!
100% ΔV_{ds} TESTED!



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	$^\circ\text{C/W}$
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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 =250μA	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} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)							
Gate Threshold Voltage		V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0		3.0	V
Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	12		mΩ
			V _{GS} =4.5V, I _D =20A	-	16		mΩ
Forward Transconductance		g _{FS}	V _{DS} =5V, I _D =20A	18	-	-	S
Dynamic Characteristics (Note4)							
Input Capacitance		C _{iss}	V _{DS} =30V, V _{GS} =0V, F=1.0MHz	-	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 =6.7Ω V _{GS} =5V, R _G =3Ω	-	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 =6.7Ω V _{GS} =10V, R _G =3Ω	-	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}	TJ = 25°C, IF =20A	-	28	-	nS
Reverse Recovery Charge		Q _{rr}	di/dt = 100A/μs (Note3)	-	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 $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_G=25\Omega$

Typical Electrical and Thermal Characteristics (Curves)

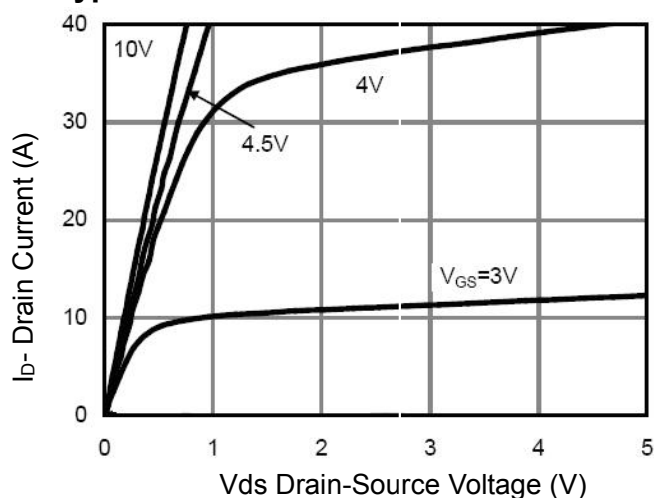


Figure 1 Output Characteristics

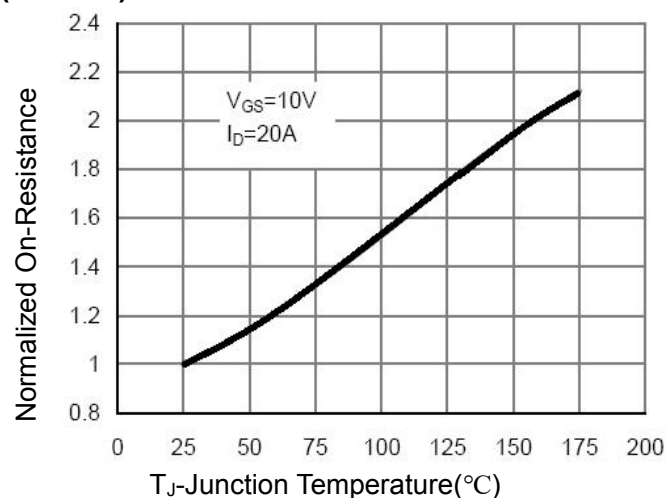


Figure 4 $R_{DS(on)}$ -Junction Temperature

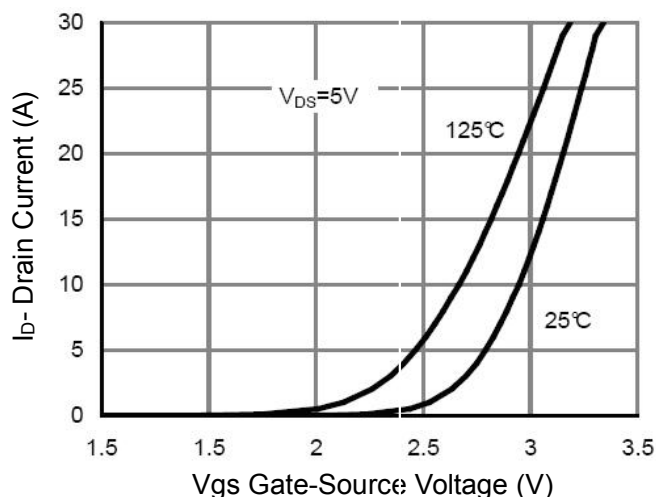


Figure 2 Transfer Characteristics

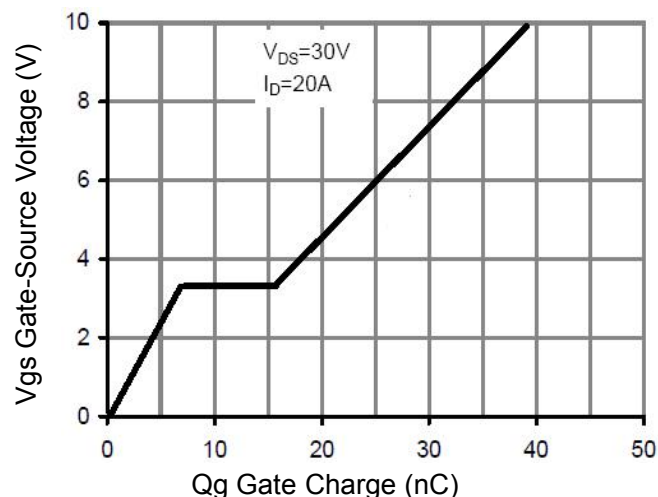


Figure 5 Gate Charge

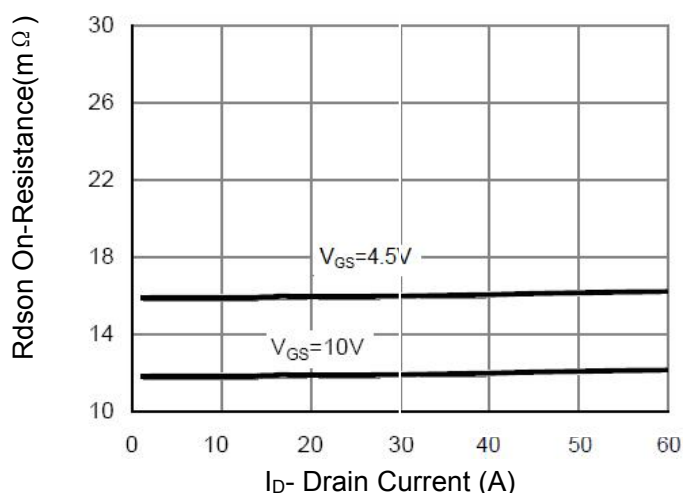


Figure 3 $R_{DS(on)}$ - Drain Current

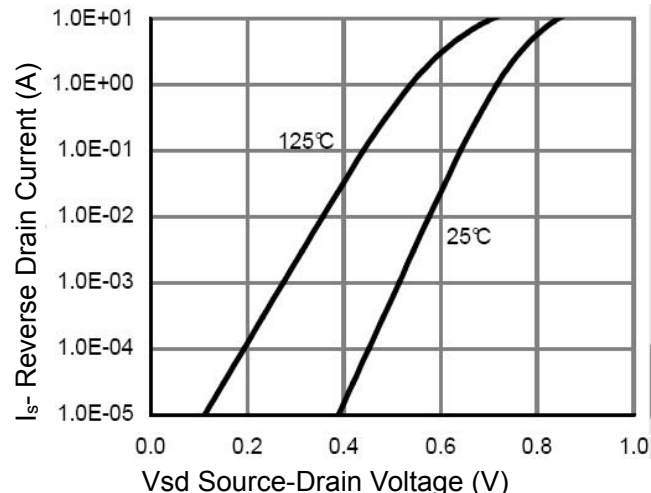


Figure 6 Source- Drain Diode Forward

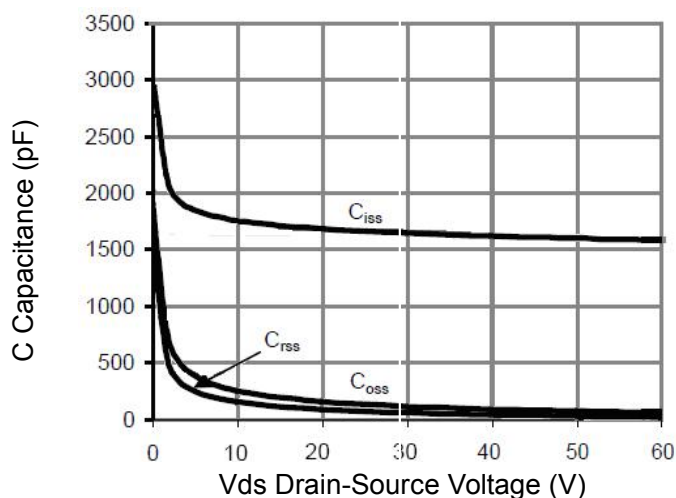


Figure 7 Capacitance vs Vds

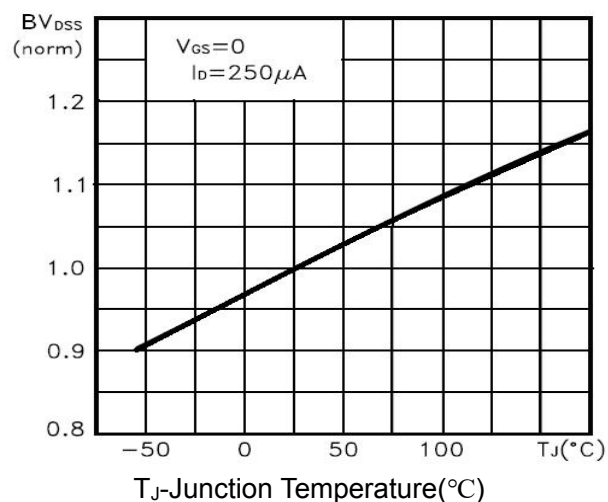


Figure 9 BV_{DSS} vs Junction Temperature

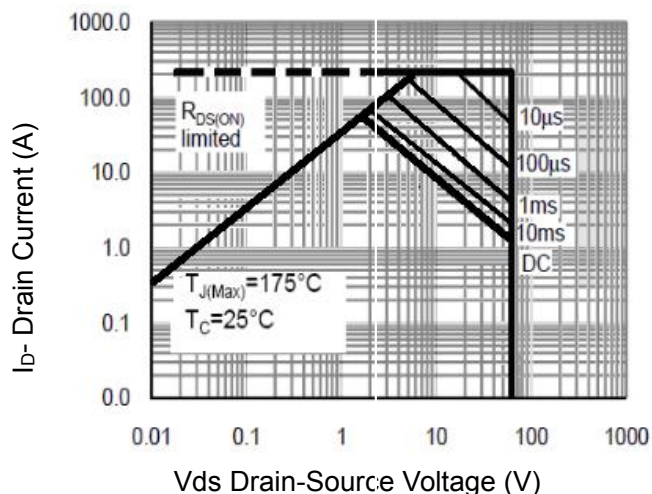


Figure 8 Safe Operation Area

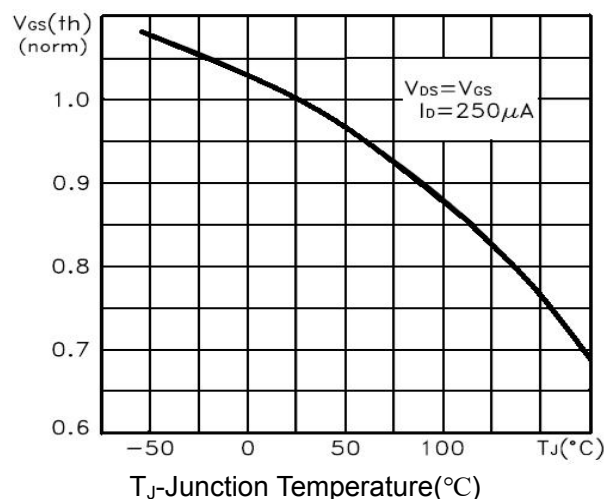


Figure 10 $V_{GS(th)}$ vs Junction Temperature

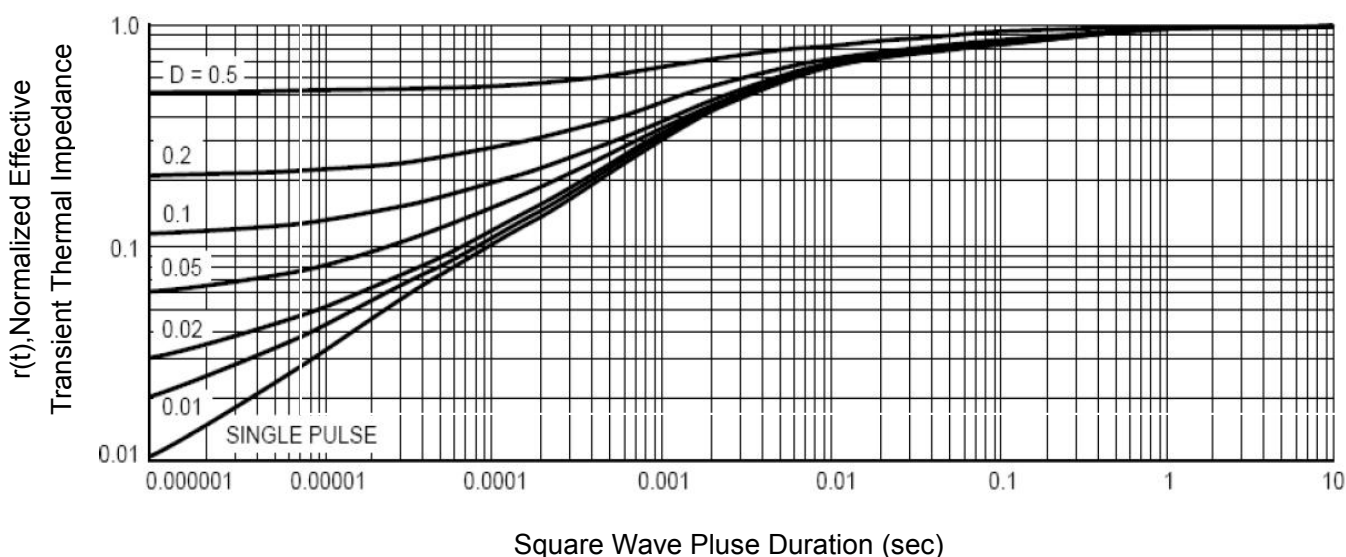


Figure 11 Normalized Maximum Transient Thermal Impedance