

Dual N-channel Enhancement Mode Power MOSFET

Features

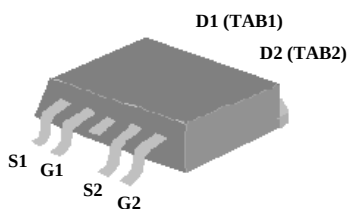
- $V_{DS} = 30V$, $I_D = 32A$
 $R_{DS(ON)} < 10\text{ m}\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)} < 15\text{ m}\Omega$ @ $V_{GS} = 4.5V$

General Features

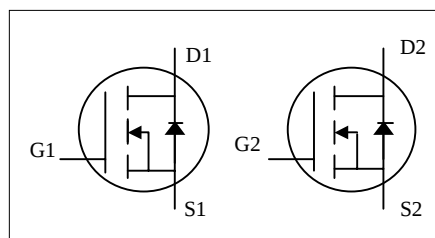
- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free and Green Available

100% UIS TESTED!

100% ΔV_{ds} TESTED!



TO252-4L



Schematic Diagram

ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)					
Parameter		Symbol	Limit	Unit	
Drain-Source Voltage		V _{DS}	30	V	
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 175 °C)	T _C = 25 °C	I _D	32	A	
	T _C = 70 °C		24		
	T _A = 25 °C		25.8 ^{b, c}		
	T _A = 70 °C		20 ^{b, c}		
Pulsed Drain Current		I _{DM}	100		
Avalanche Current Pulse	L = 0.1 mH	I _{AS}	39	mJ	
Single Pulse Avalanche Energy		E _{AS}	94.8		
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	90 ^{a, e}	A	
	T _A = 25 °C		3.13 ^{b, c}		
Maximum Power Dissipation	T _C = 25 °C	P _D	250 ^a	W	
	T _C = 70 °C		175		
	T _A = 25 °C		3.75 ^{b, c}		
	T _A = 70 °C		2.63 ^{b, c}		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typ.	Max.	Unit
Maximum Junction-to-Ambient ^{b, d}	$t \leq 10\text{ sec}$	R_{thJA}	32	40	$^{\circ}\text{C/W}$
Maximum Junction-to-Case	Steady State	R_{thJC}	0.5	0.6	

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	30			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		35		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 7.5		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0		2.5	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	90			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 38.8 A		0.010		Ω
		V _{GS} = 4.5 V, I _D = 37 A		0.015		
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 38.8 A		160		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		1200		pF
Output Capacitance	C _{oss}			520		
Reverse Transfer Capacitance	C _{rss}			140		
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 38.8 A		171		nC
		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 28.8 A		81		
Gate-Source Charge	Q _{gs}			34		
Gate-Drain Charge	Q _{gd}			29		
Gate Resistance	R _g	f = 1 MHz		1.4	2.1	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 0.625 Ω I _D ≅ 24 A, V _{GEN} = 10 V, R _g = 1 Ω		18	27	ns
Rise Time	t _r			11	17	
Turn-Off Delay Time	t _{d(off)}			70	105	
Fall Time	t _f			10	15	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 0.67 Ω I _D ≅ 22.5 A, V _{GEN} = 4.5 V, R _g = 1 Ω		55	83	
Rise Time	t _r			180	270	
Turn-Off Delay Time	t _{d(off)}			55	83	
Fall Time	t _f			12	18	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			120	A
Pulse Diode Forward Current ^a	I _{SM}				120	
Body Diode Voltage	V _{SD}	I _S = 22 A		0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs, T _J = 25 °C		52	78	ns
Body Diode Reverse Recovery Charge	Q _{rr}			70.2	105	nC
Reverse Recovery Fall Time	t _a			27		ns
Reverse Recovery Rise Time	t _b			25		

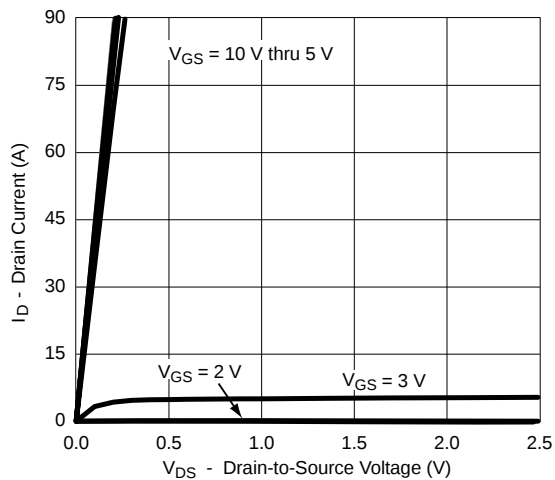
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

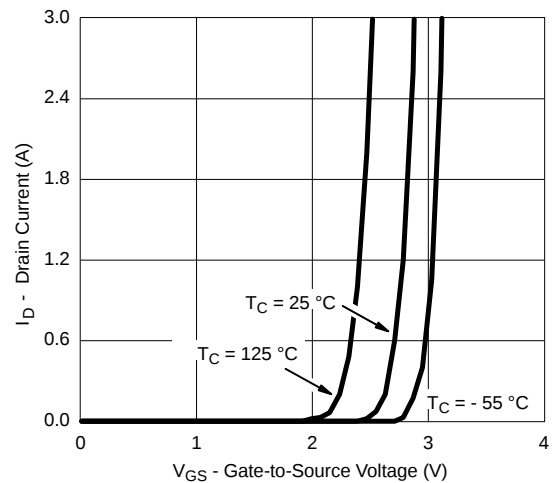
b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

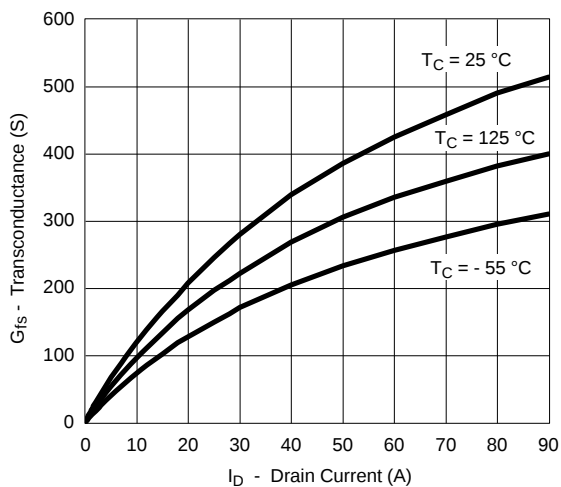
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



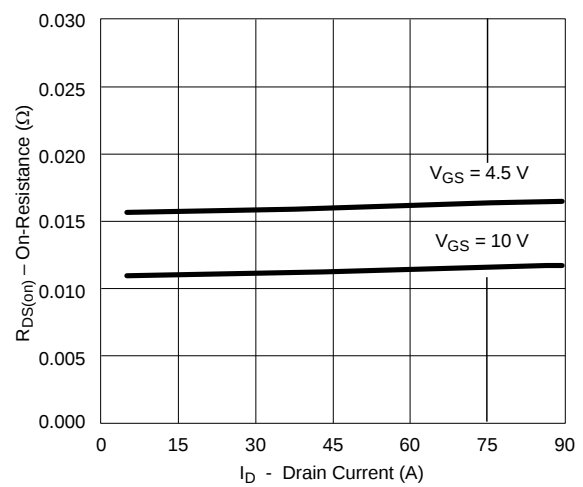
Output Characteristics



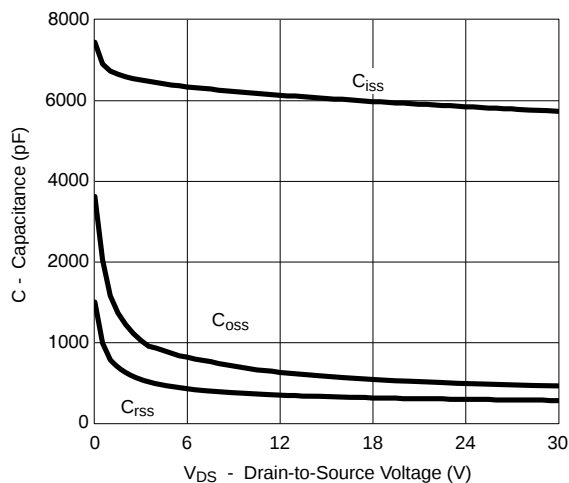
Transfer Characteristics



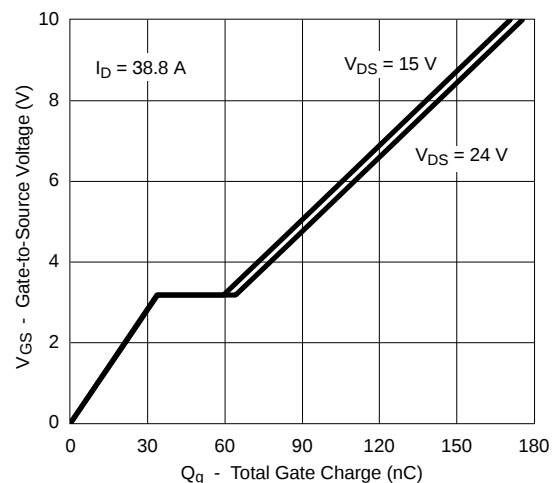
Transconductance



$R_{DS(on)}$ vs. Drain Current



Capacitance

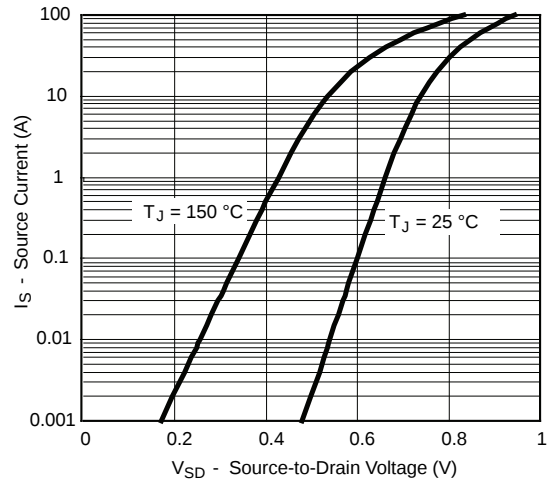


Gate Charge

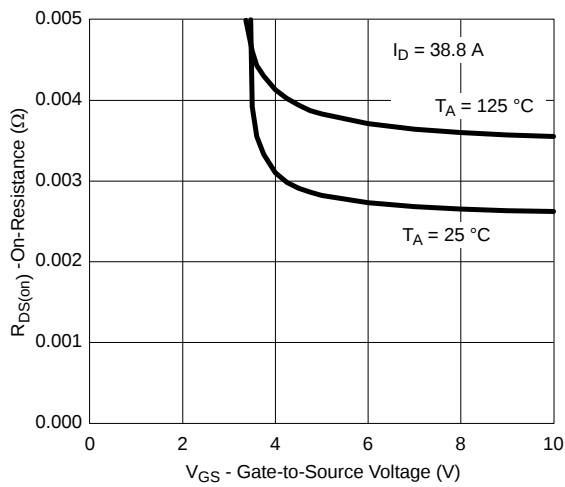
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



On-Resistance vs. Junction Temperature



Forward Diode Voltage vs. Temperature



$R_{DS(on)}$ vs. V_{GS} vs. Temperature

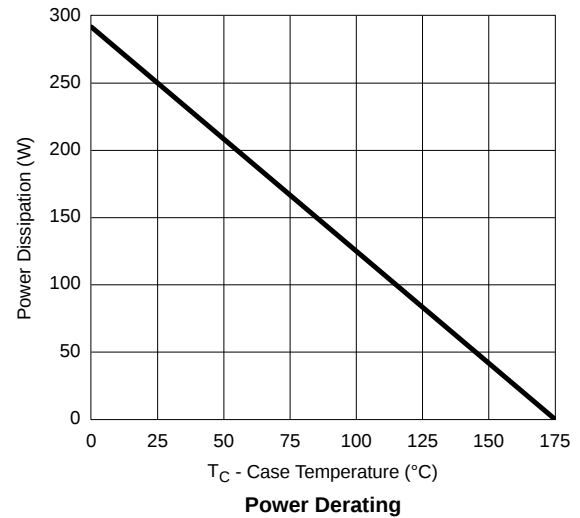
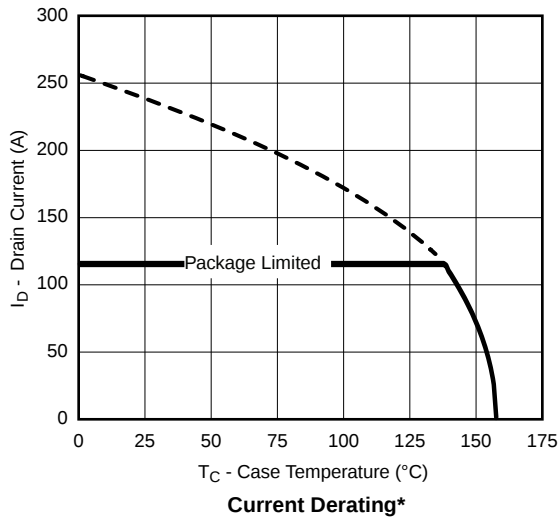


Threshold Voltage



Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



*The power dissipation P_D is based on $T_{J(max)} = 175$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

