

N-Channel 60 V (D-S) MOSFET

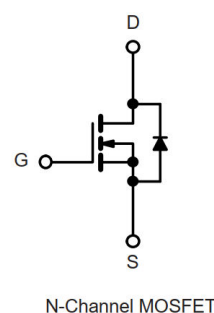
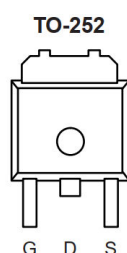
PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (mΩ) (Typ.)	I _D (A) ^a	Q _g (Typ.)
60	74 at V _{GS} = 10 V	20	7.2 nC
	78 at V _{GS} = 4.5 V	13	

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC

APPLICATIONS

- DC/DC Converters


RoHS
 COMPLIANT


ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	60	V
Gate-Source Voltage		V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	T _C = 25 °C	I _D	20	A
	T _C = 70 °C		12.1	
	T _A = 25 °C		9.1 ^a	
	T _A = 70 °C		7.6 ^a	
Pulsed Drain Current		I _{DM}	60	
Continuous Source-Drain Diode Current	T _C = 25 °C	I _S	17.8	
	T _A = 25 °C		3.8 ^a	
Single Pulse Avalanche Current	L = 0.1 mH	I _{AS}	18	mJ
Avalanche Energy		E _{AS}	26	
Maximum Power Dissipation	T _C = 25 °C	P _D	31.25	W
	T _C = 70 °C		20	
	T _A = 25 °C		5.7 ^a	
	T _A = 70 °C		3.6 ^a	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	t ≤ 10 s	R _{thJA}	18	22	°C/W
Maximum Junction-to-Case	Steady State	R _{thJC}	3.2	4.0	

Notes:

a. Surface mounted on 1" x 1" FR4 board, t ≤ 10 s.

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	60			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		65		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 6.3		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.0		3.0	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} = 60 V, V _{GS} = 0 V			1.0	μA
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 70 °C			20	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	50			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 8 A		74	81	Ω
		V _{GS} = 4.5 V, I _D = 6 A		78	89	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 8 A		15		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz		262		pF
Output Capacitance	C _{oss}			25		
Reverse Transfer Capacitance	C _{rss}			19		
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 10 V, I _D = 8 A		7.2		nC
Gate-Source Charge	Q _{gs}			1.0		
Gate-Drain Charge	Q _{gd}			2.3		
Gate Resistance	R _g	f = 1 MHz		1.6		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 30 V, R _L = 1.3 Ω I _D ≅ 8 A, V _{GEN} = 4.5 V, R _g = 1 Ω		15		ns
Rise Time	t _r			240		
Turn-Off Delay Time	t _{d(off)}			32		
Fall Time	t _f			64		
Turn-On Delay Time	t _{d(on)}	V _{DD} = 30 V, R _L = 1.3 Ω I _D ≅ 8 A, V _{GEN} = 10 V, R _g = 1 Ω		6		
Rise Time	t _r			13		
Turn-Off Delay Time	t _{d(off)}			27		
Fall Time	t _f			23		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			20	A
Pulse Diode Forward Current ^a	I _{SM}				60	
Body Diode Voltage	V _{SD}	I _S = 1 A			1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 8 A, dI/dt = 100 A/μs, T _J = 25 °C		25	60	ns
Body Diode Reverse Recovery Charge	Q _{rr}			31	70	nC
Reverse Recovery Fall Time	t _a			18		ns
Reverse Recovery Rise Time	t _b			8		

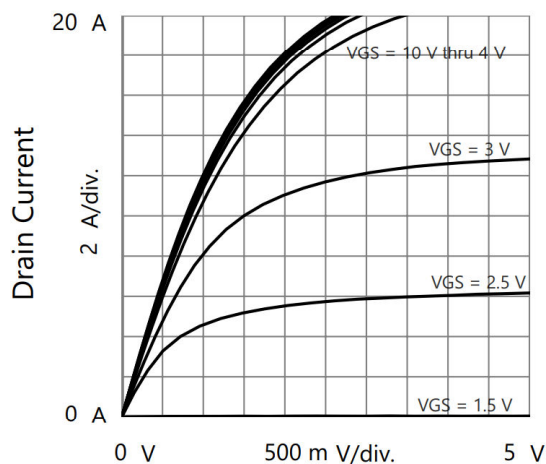
Notes:

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

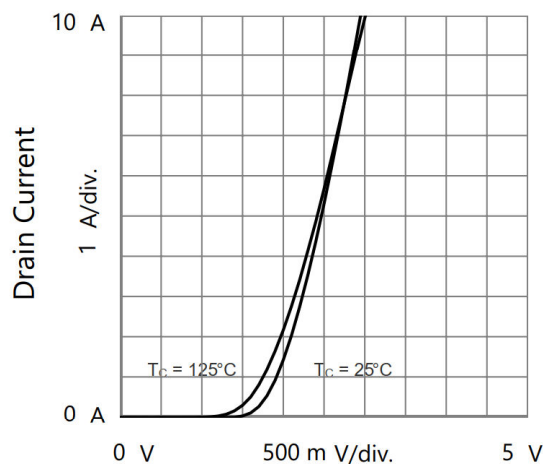
b. Guaranteed by design, not subject to production testing.

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.

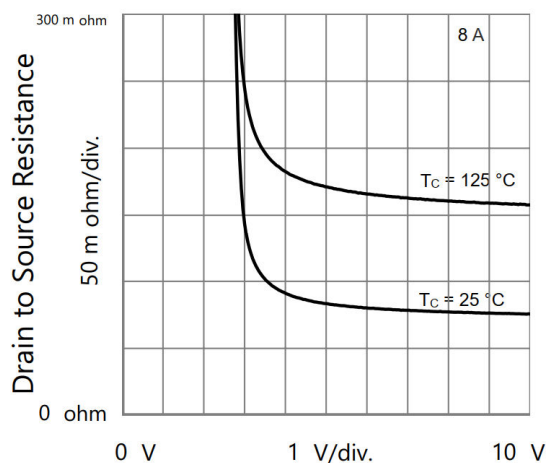
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)



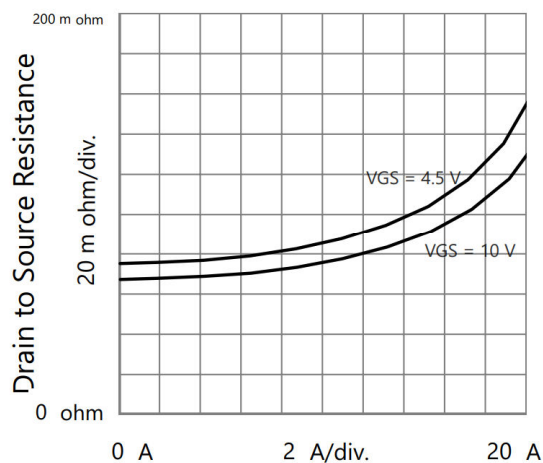
Drain to Source Voltage
Output Characteristics



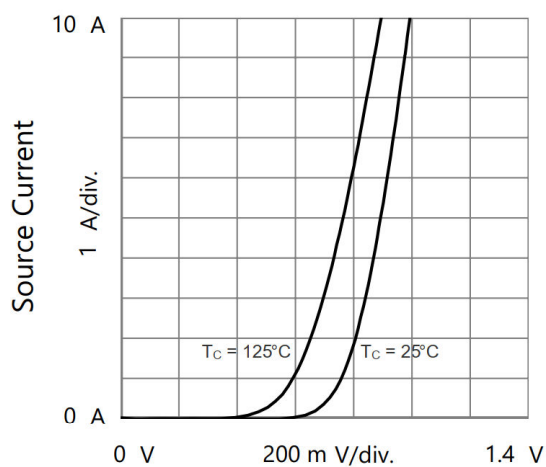
Gate to Source Voltage
Transfer Characteristics



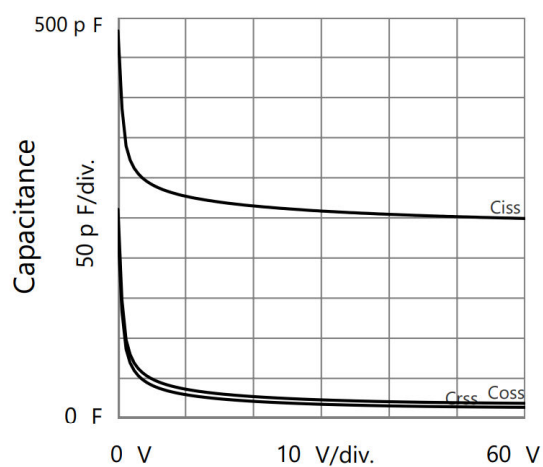
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

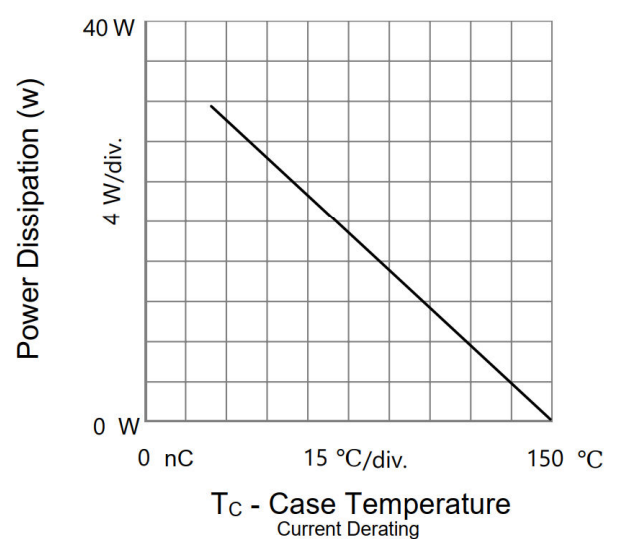
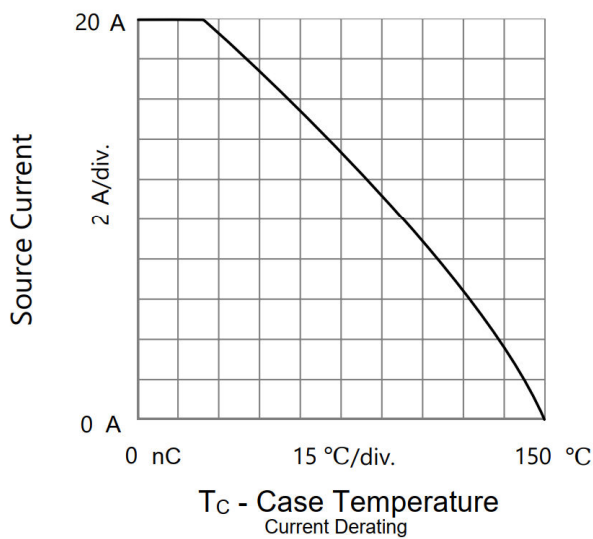
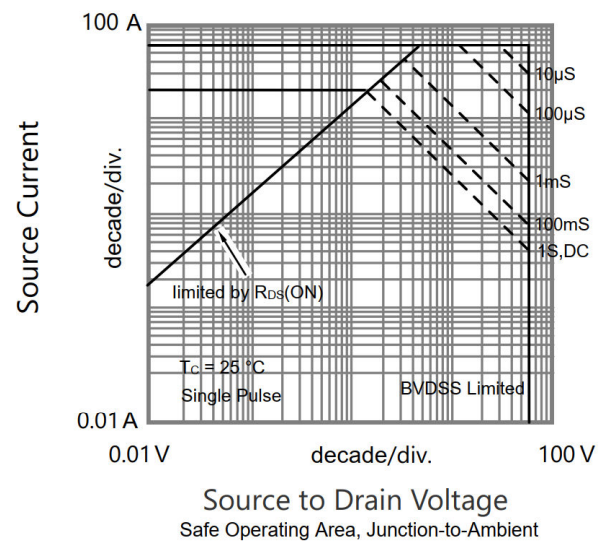
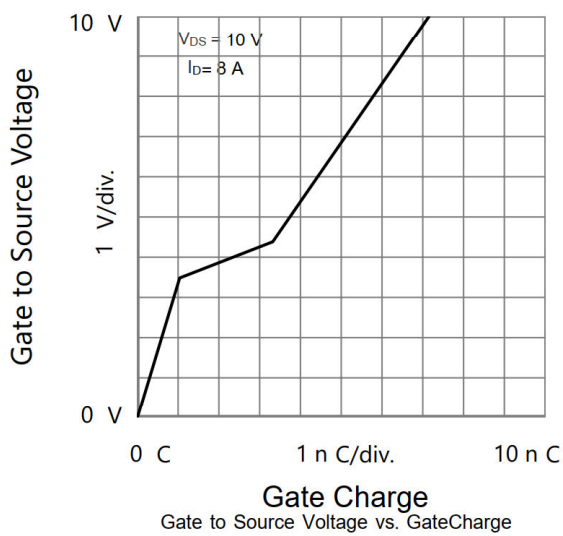


Source to Drain Voltage
Body Diode Forward Characteristics

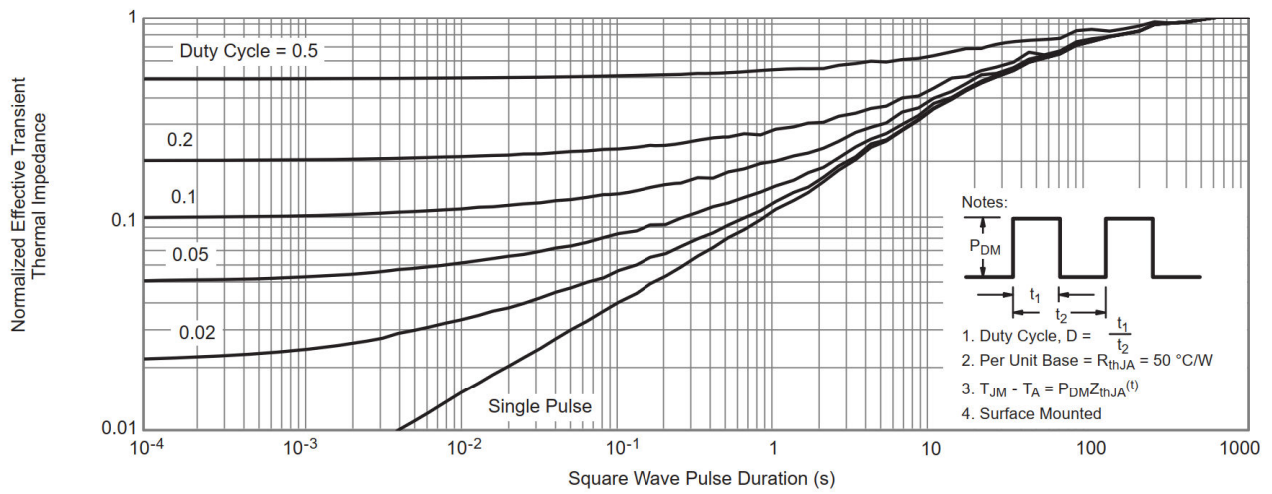


Drain to Source Voltage
Capacitances

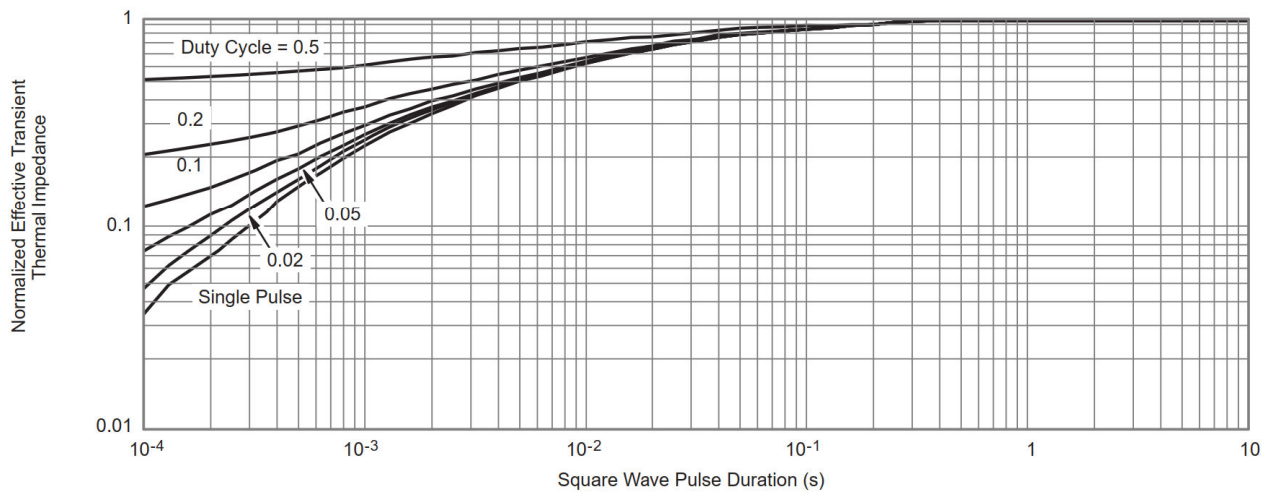
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Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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