

N-Channel 40 V (D-S) Power MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)(Typ.)	I_D (A) ^a
40	1.6 at $V_{GS} = 10$ V	160

FEATURES

- 175 °C Junction Temperature
- DT-Trench Power MOSFET
- 100% UIS and 100% R_g Tested

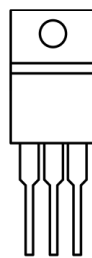
APPLICATIONS

- Boost converters
- Industrial power supplies

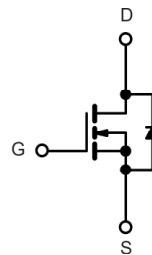


RoHS
COMPLIANT

TO-220AB



G D S
Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175$ °C) ^b	I_D	$T_C = 25$ °C 160 ^a	A
		$T_C = 100$ °C 130 ^a	
Pulsed Drain Current	I_{DM}	480	
Continuous Source Current (Diode Conduction)	I_S	160 ^a	
Avalanche Current	I_{AS}	155	
Single Avalanche Energy (Duty Cycle ≤ 1 %)	E_{AS}	720	mJ
Maximum Power Dissipation	P_D	$T_C = 25$ °C 375	W
		$T_A = 25$ °C 3.4 ^b	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	38	50	°C/W
Maximum Junction-to-Case	R_{thJC}	0.6	1.0	

Notes:

a. Package limited.

b. Surface mounted on 1" x 1" FR4 board.

c. $t \leq 10$ s.

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	40	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.5	-	3.5	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 32 V, V _{GS} = 0 V, T _J = 125 °C	-	-	50	
		V _{DS} = 32 V, V _{GS} = 0 V, T _J = 175 °C	-	-	250	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	160	-	-	A
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A	-	1.6	2.0	mΩ
		V _{GS} = 10 V, I _D = 30 A, T _J = 125 °C	-	2.5	3.5	
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C	-	4.0	5.8	
Forward Transconductance ^b	g _{fs}	V _{DS} = 5 V, I _D = 30 A	-	66	-	S
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 20 V, f = 1 MHz	-	11700	-	pF
Output Capacitance	C _{oss}		-	1004	-	
Reverse Transfer Capacitance	C _{rss}		-	1003	-	
Total Gate Charge ^c	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D = 30 A	-	149	-	nC
Gate-Source Charge ^c	Q _{gs}		-	28	-	
Gate-Drain Charge ^c	Q _{gd}		-	43	-	
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 20 V, R _L = 0.6 Ω I _D = 30 A, V _{GEN} = 10 V, R _g = 2.5 Ω	-	10	-	ns
Rise Time ^c	t _r		-	5	-	
Turn-Off Delay Time ^c	t _{d(off)}		-	55	-	
Fall Time ^c	t _f		-	12	-	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C)						
Pulsed Current	I _{SM}		-	-	480	A
Diode Forward Voltage	V _{SD}	I _F = 1 A, V _{GS} = 0 V	-	0.65	1	V
Reverse Recovery Time	t _{rr}	I _F = 30 A, di/dt = 100 A/μs	-	45	100	ns

Notes:

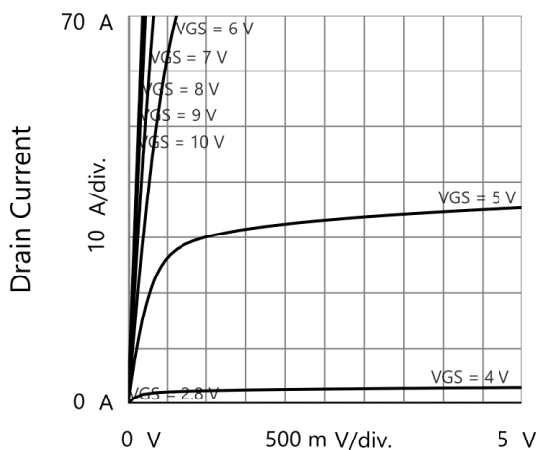
a. For design aid only; not subject to production testing.

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

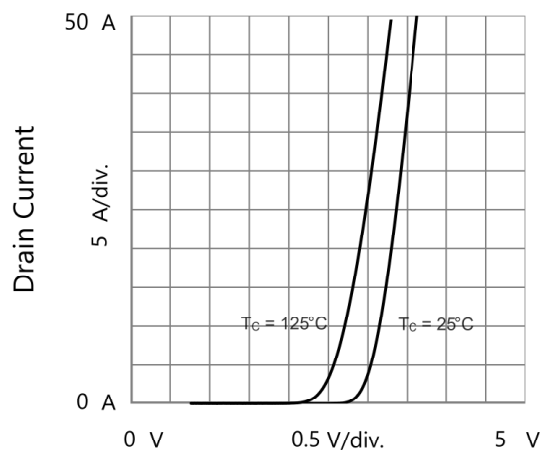
c. Independent of operating temperature.

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.

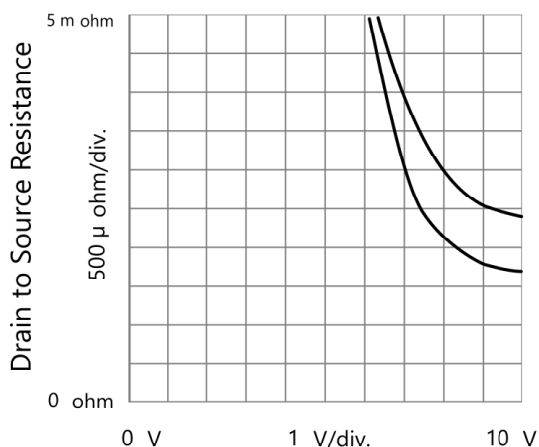
TYPICAL CHARACTERISTICS (25 °C unless noted)



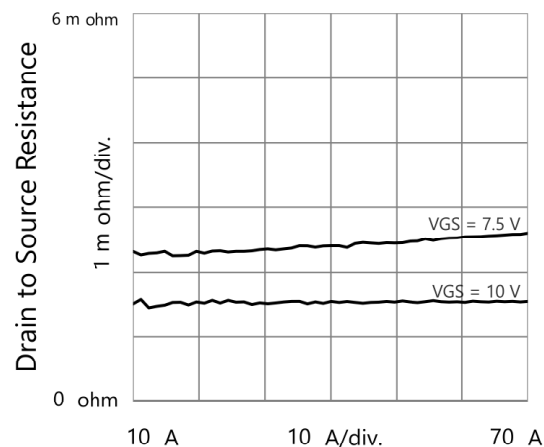
Drain to Source Voltage
Output Characteristics



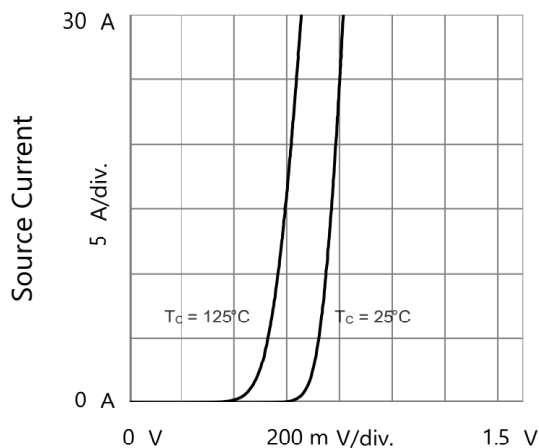
Gate to Source Voltage
Transfer Characteristics



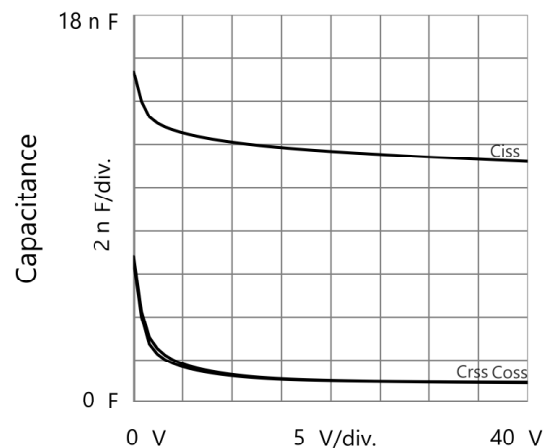
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

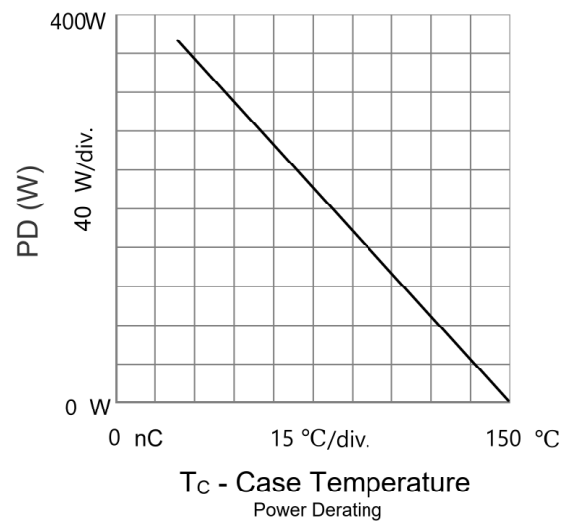
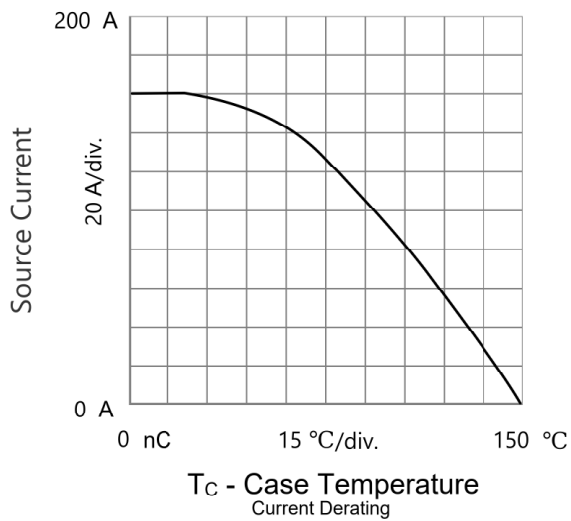
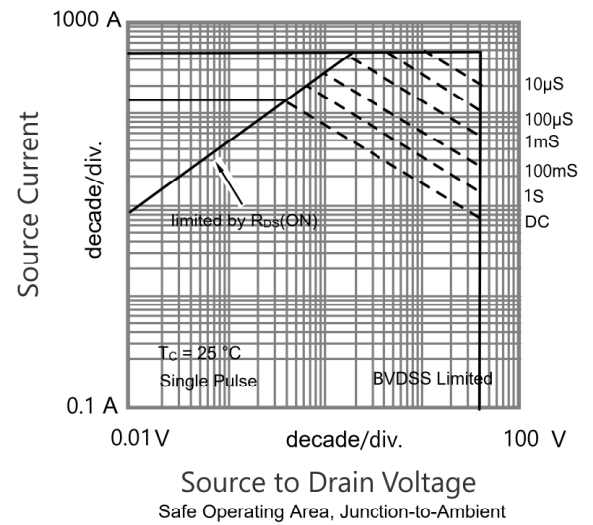
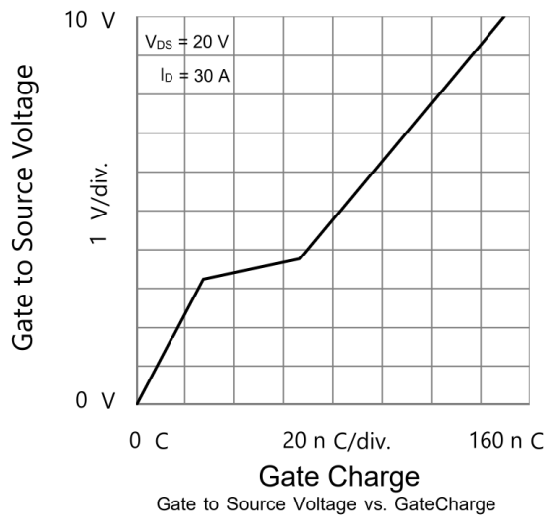


Source to Drain Voltage
Body Diode Forward Characteristics



Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 °C unless noted)



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