

N-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω) (TYP.)	I_D (A) ^{a,e}	Q_g (TYP.)
40	0.75 at $V_{GS} = 10$ V	240	115 nC

FEATURES

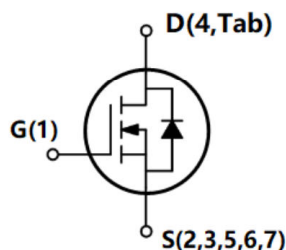
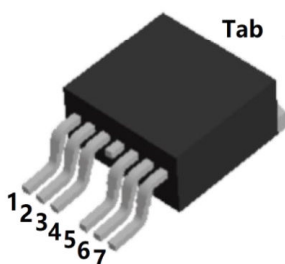
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- Fast switching speed


RoHS
 COMPLIANT

APPLICATIONS

- DC/DC Conversion
- Power Switch

TO-263-7L



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 175$ °C)	I_D	$T_C = 25$ °C	240 ^{a,e}
		$T_C = 70$ °C	210
		$T_A = 25$ °C	47 ^{b, c}
		$T_A = 70$ °C	40 ^{b, c}
Pulsed Drain Current	I_{DM}	960	
Avalanche Current Pulse	I_{AS}	230	
Single Pulse Avalanche Energy	E_{AS}	1600	mJ
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	200 ^a
		$T_A = 25$ °C	46 ^{b, c}
Maximum Power Dissipation	P_D	$T_C = 25$ °C	375 ^a
		$T_C = 70$ °C	262
		$T_A = 25$ °C	3.7 ^{b, c}
		$T_A = 70$ °C	2.6 ^{b, c}
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 ^{b, d}	R_{thJA}	35	40.5	°C/W
Maximum Junction-to-Case	R_{thJC}	0.25	0.4	

Notes:

a. Based on $T_C = 25$ °C.

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

c. $t = 10$ s.

d. Calculated based on maximum junction temperature.

e. Package limited.

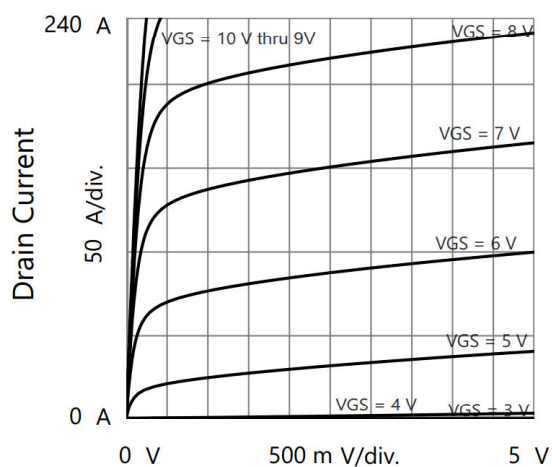
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	40			V
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.5		4.0	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40 V, V _{GS} = 0 V			1	μA
		V _{DS} = 32 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	320			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 90 A		0.75	0.95	mΩ
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 90 A		258		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1 MHz		6900		pF
Output Capacitance	C _{oss}			2270		
Reverse Transfer Capacitance	C _{rss}			229		
Total Gate Charge	Q _g	V _{DS} = 20 V, V _{GS} = 10 V, I _D =90 A		115		nC
Gate-Source Charge	Q _{gs}			32.5		
Gate-Drain Charge	Q _{gd}			49		
Gate Resistance	R _g	f = 1 MHz		1.8		Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 20 V, R _L = 0.555 Ω I _D ≅ 90A, V _{GEN} = 10 V, R _g = 1 Ω		50		ns
Rise Time	t _r			76		
Turn-Off Delay Time	t _{d(off)}			130		
Fall Time	t _f			47		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			240	A
Pulse Diode Forward Current ^a	I _{SM}				960	
Body Diode Voltage	V _{SD}	I _S = 90 A		0.6	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	V _{DS} = 20 V, I _F = 180 A, di/dt = 100 A/μs		72		ns
Body Diode Reverse Recovery Charge	Q _{rr}			170		nC

Notes:

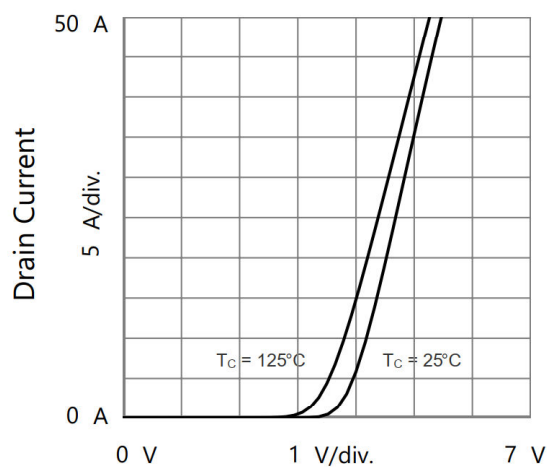
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

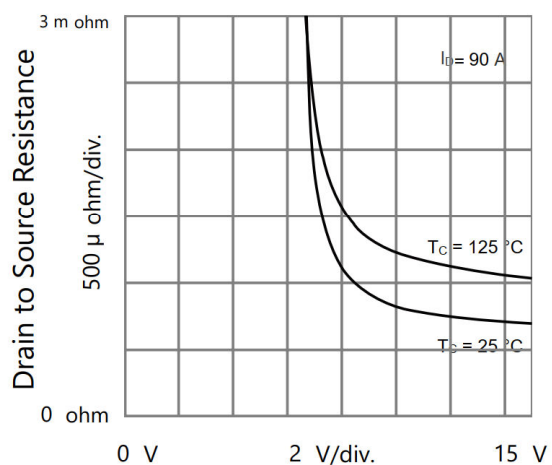
TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise noted)



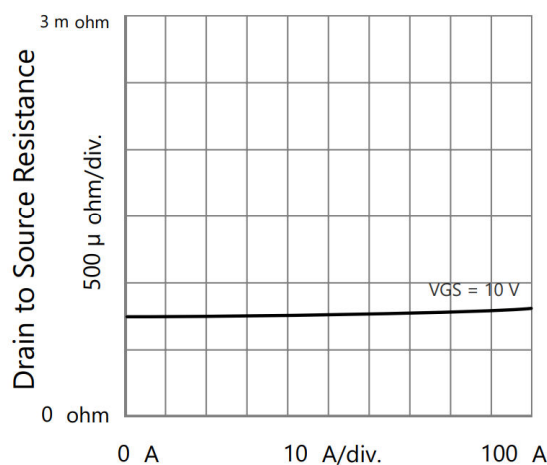
Drain to Source Voltage
Output Characteristics



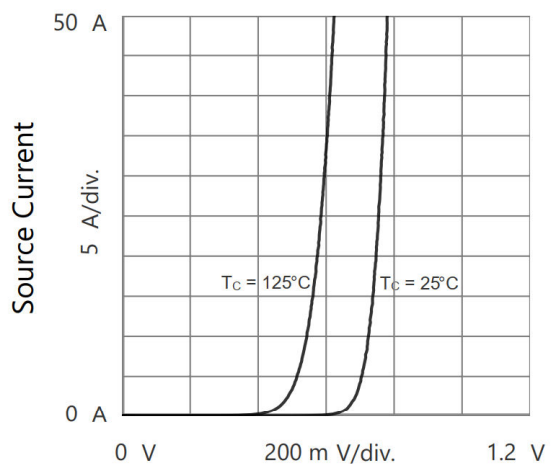
Gate to Source Voltage
Transfer Characteristics



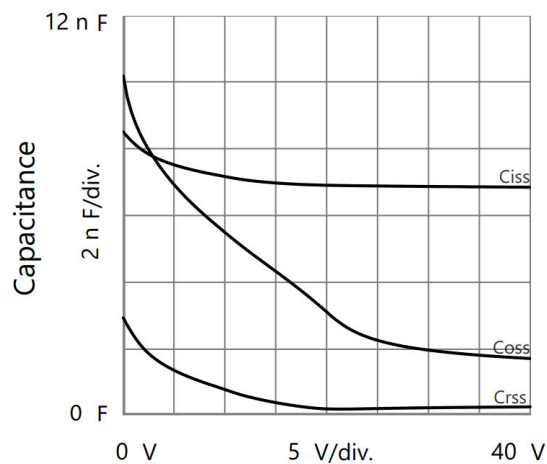
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

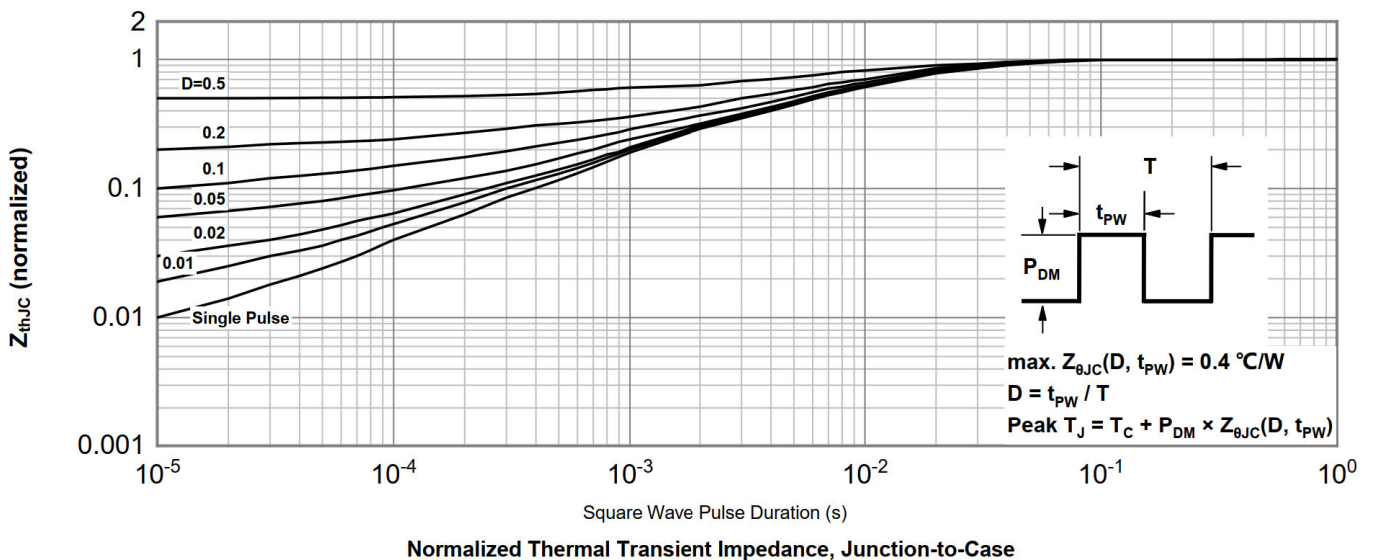
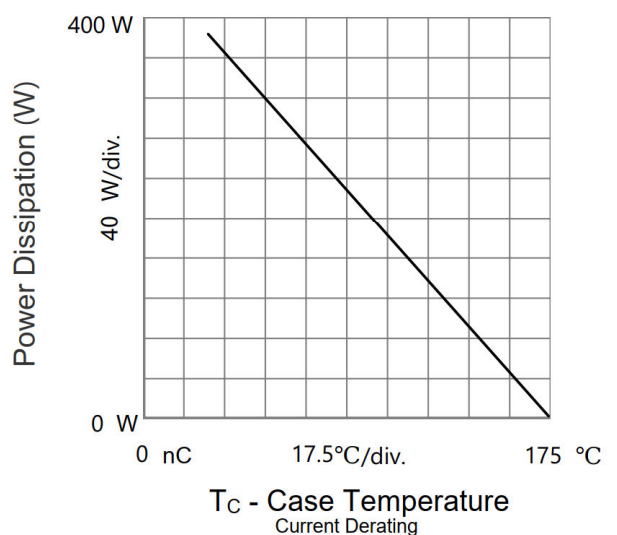
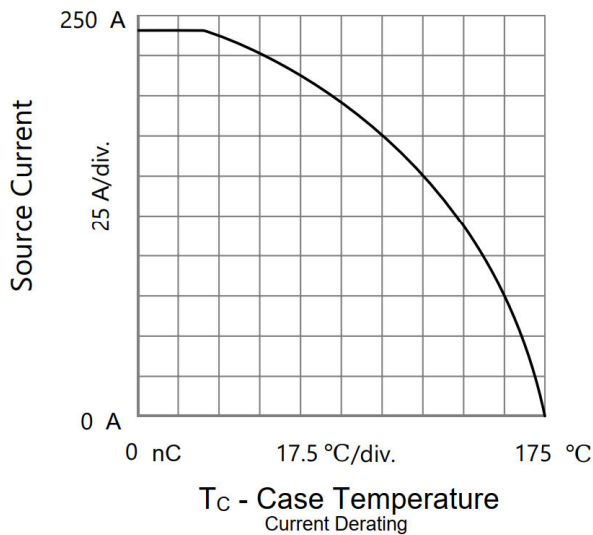
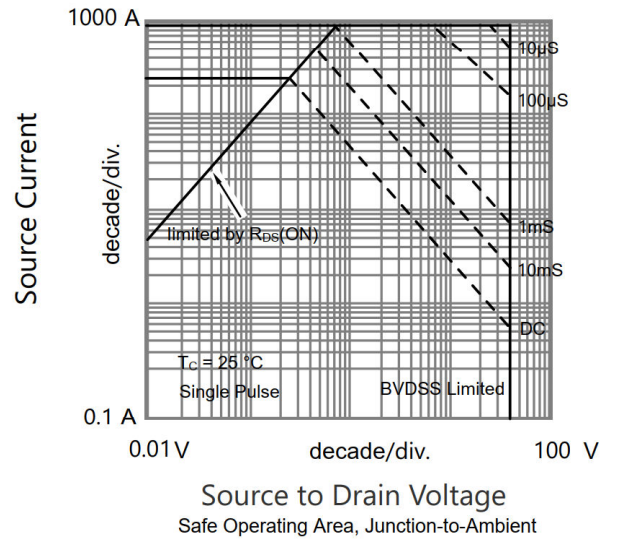
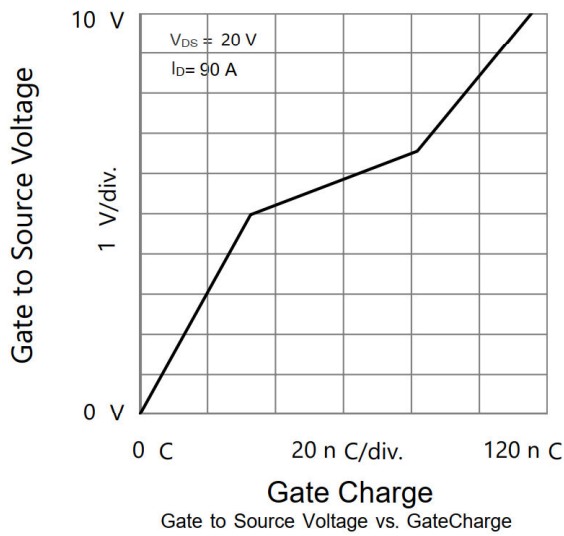


Source to Drain Voltage
Body Diode Forward Characteristics



Drain to Source Voltage
Capacitances

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



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