

N-Channel 120 V (D-S) MOSFET

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ)(Typ.)	I _D (A) ^a	Q _g (Typ.)
120	1.35 at V _{GS} = 10 V	393	135 nC

FEATURES

- DT-SGT Power MOSFET
- Very Low On-resistance
- Excellent FOM(Figure of Merit)
- 100% ΔVDS & UIS & Rg Tested

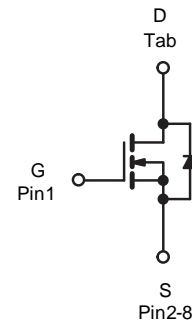
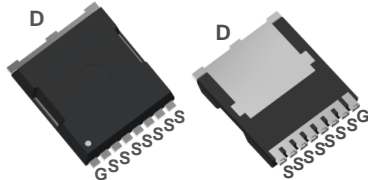


RoHS
COMPLIANT

APPLICATIONS

- DC-DC Converter
- Hard Switching and High Speed Circuit
- Synchronous Rectification in SMPS

TOLL Pin Configuration



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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	120	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 175 °C) ^a	I _D	T _C = 25 °C	393
		T _C = 100 °C	278
Pulsed Drain Current ^b	I _{DM}	1574	A
Single Avalanche Energy	E _{AS}	2074	mJ
Maximum Power Dissipation ^c	P _D	T _C = 25 °C	500
		T _C = 100 °C	250
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +175	°C

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^d	R _{thJA}	25	°C/W
Junction-to-Case (Drain)	R _{thJC}	0.3	

Notes

- Calculated continuous current based on maximum allowable junction temperature.
- Repetitive rating; pulse width limited by max. junction temperature.
- P_d is based on max. junction temperature, using junction-case thermal resistance.
- The value of R_{thJA} is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper, in a still air environment with T_a=25 °C.

SPECIFICATIONS (T _C = 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	120	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2.0	-	4.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 120 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 96 V, V _{GS} = 0 V, T _J = 125 °C	-	-	100	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	393	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 80 A	-	1.35	1.6	mΩ
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 20 A	-	74	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 60 V, f = 1 MHz	-	10308	-	pF
Output Capacitance	C _{oss}		-	4393	-	
Reverse Transfer Capacitance	C _{rss}		-	41	-	
Total Gate Charge ^c	Q _g	V _{DS} = 60 V, V _{GS} = 10 V, I _D = 80 A	-	135	-	nC
Gate-Source Charge ^c	Q _{gs}		-	53	-	
Gate-Drain Charge ^c	Q _{gd}		-	20	-	
Gate Resistance	R _g	f = 1 MHz	-	1.5	-	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 60 V, R _{GEN} = 3 Ω, I _D = 80 A, V _{GS} = 10 V	-	33	-	ns
Rise Time ^c	t _r		-	42	-	
Turn-Off Delay Time ^c	t _{d(off)}		-	97	-	
Fall Time ^c	t _f		-	43	-	
Drain-Source Body Diode Ratings and Characteristics ^b (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	-	-	393	A
Pulsed Current	I _{SM}		-	-	1574	A
Forward Voltage ^a	V _{SD}	I _F = 2 A, V _{GS} = 0 V	-	0.7	1.2	V
Reverse Recovery Time	t _{rr}	I _F = 80 A, di/dt = 100 A/μs	-	110	-	ns
Reverse Recovery Charge	Q _{rr}		-	301	-	nC

Notes

- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- Guaranteed by design, not subject to production testing.
- 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 otherwise noted)

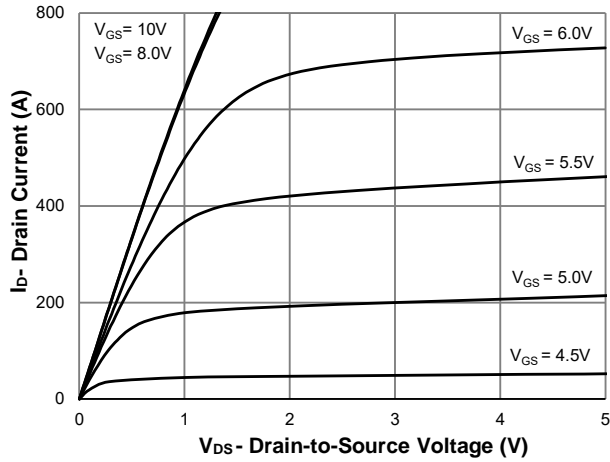


Figure 1: Output Characteristics

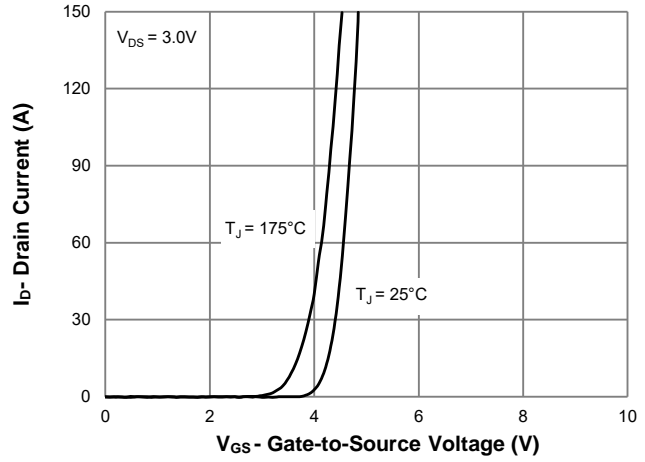


Figure 2: Transfer Characteristics

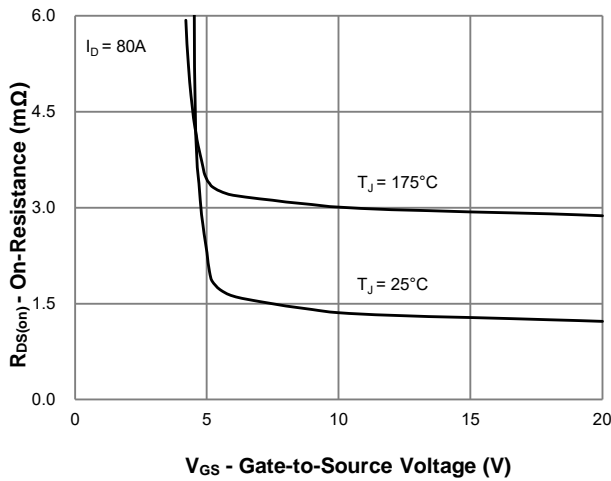


Figure 3: On-Resistance vs. Gate-Source Voltage

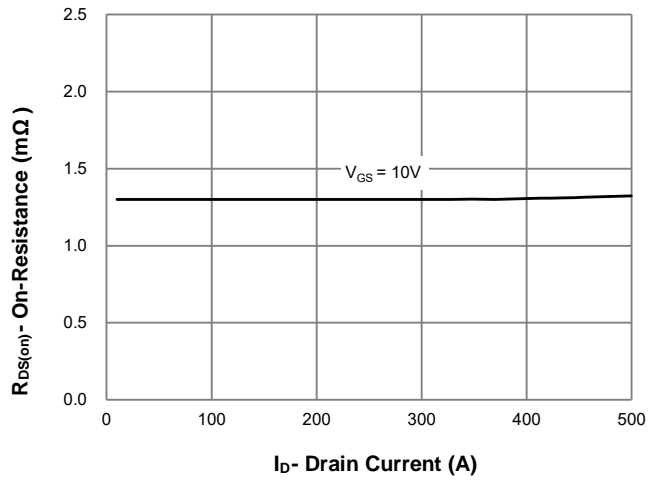


Figure 4: On-Resistance vs. Gate-Source Voltage

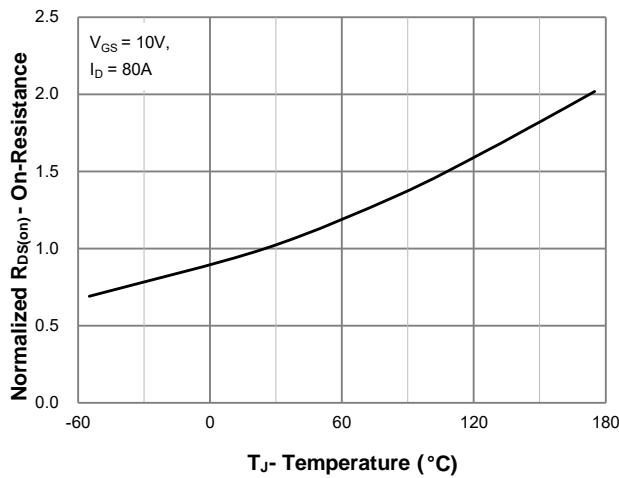


Figure 5: On-Resistance vs. Junction Temperature

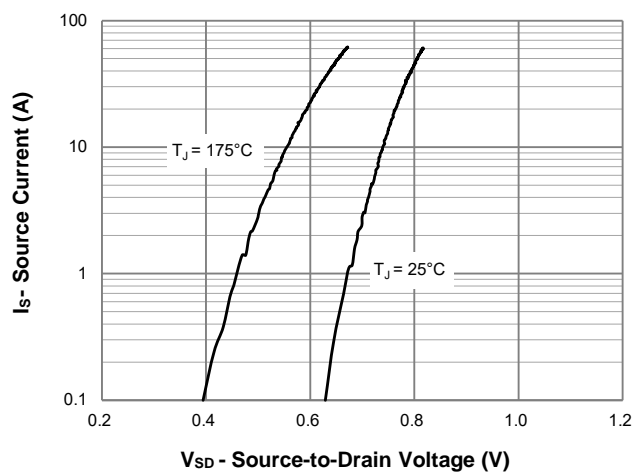


Figure 6: Source-Drain Diode Forward Voltage

TYPICAL CHARACTERISTICS (25°C unless otherwise noted)

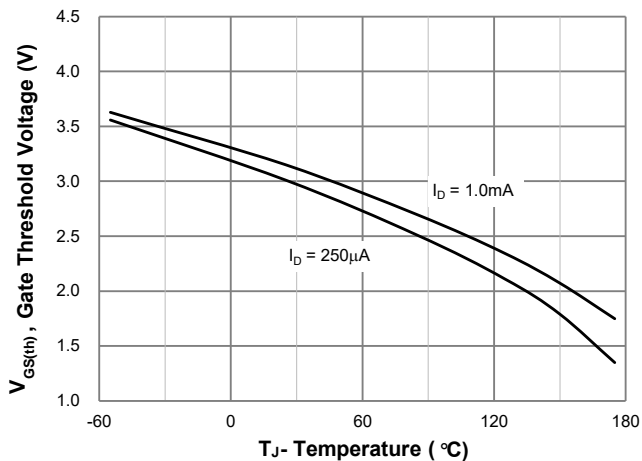


Figure 7: Gate Threshold Variation vs. Junction Temperature

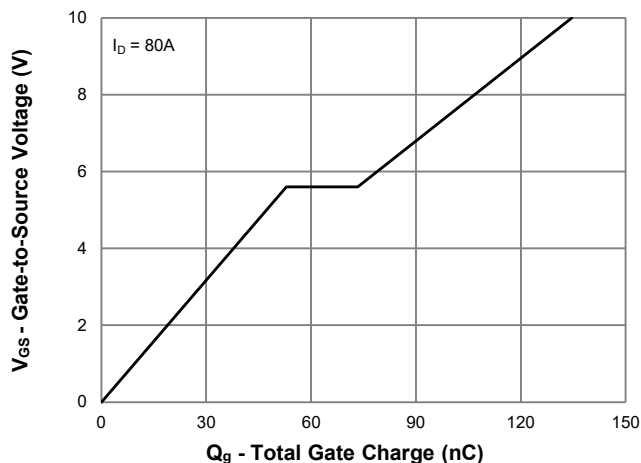


Figure 8: Gate Charge Characteristics

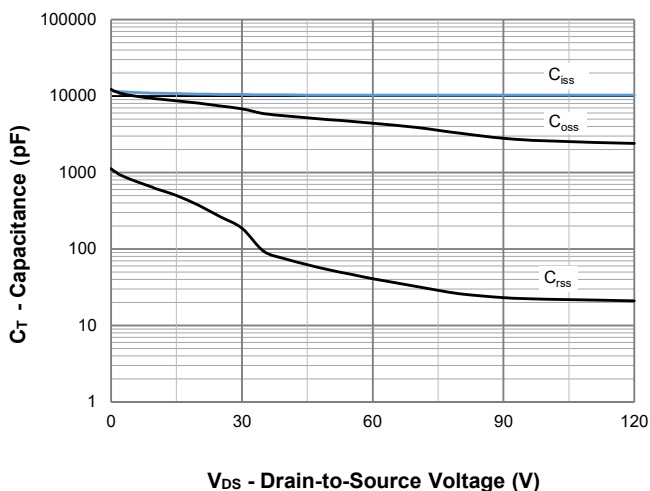


Figure 9: Capacitance Characteristics

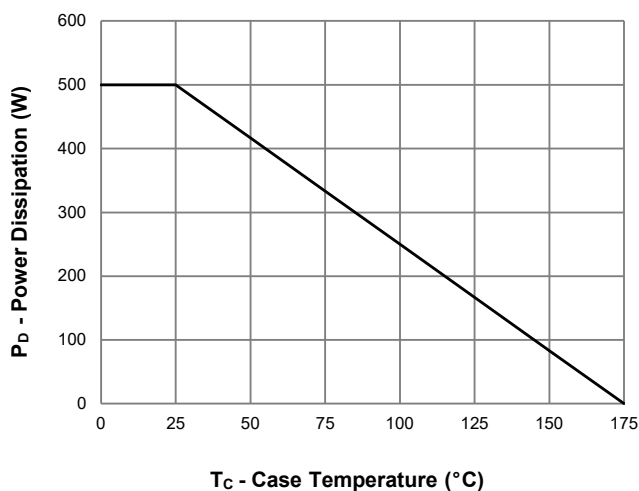


Figure 10: Power Derating

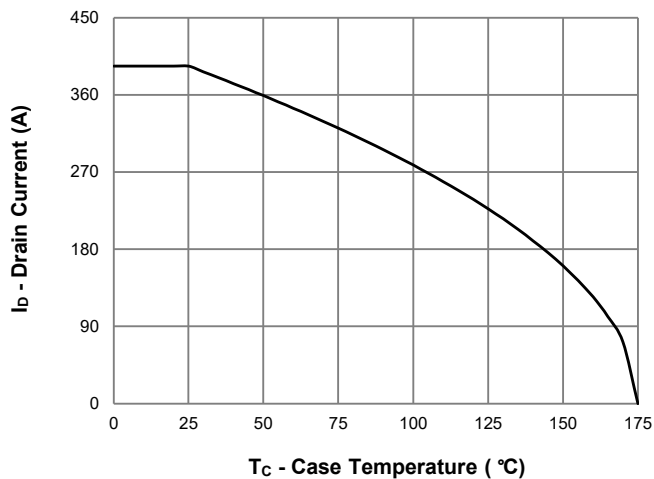


Figure 11: Current Derating

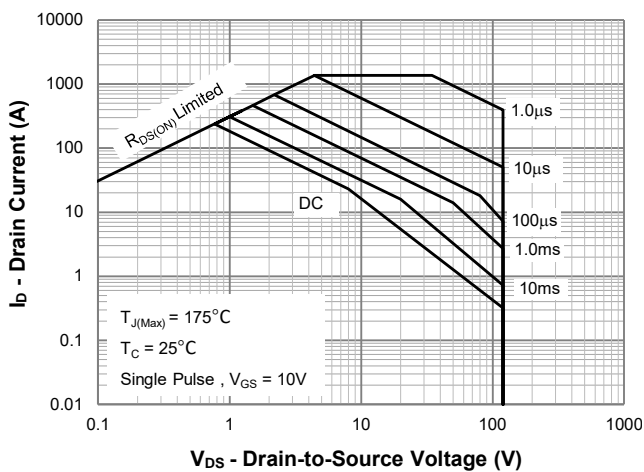


Figure 12: Safe Operating Area

TYPICAL CHARACTERISTICS (25°C unless otherwise noted)

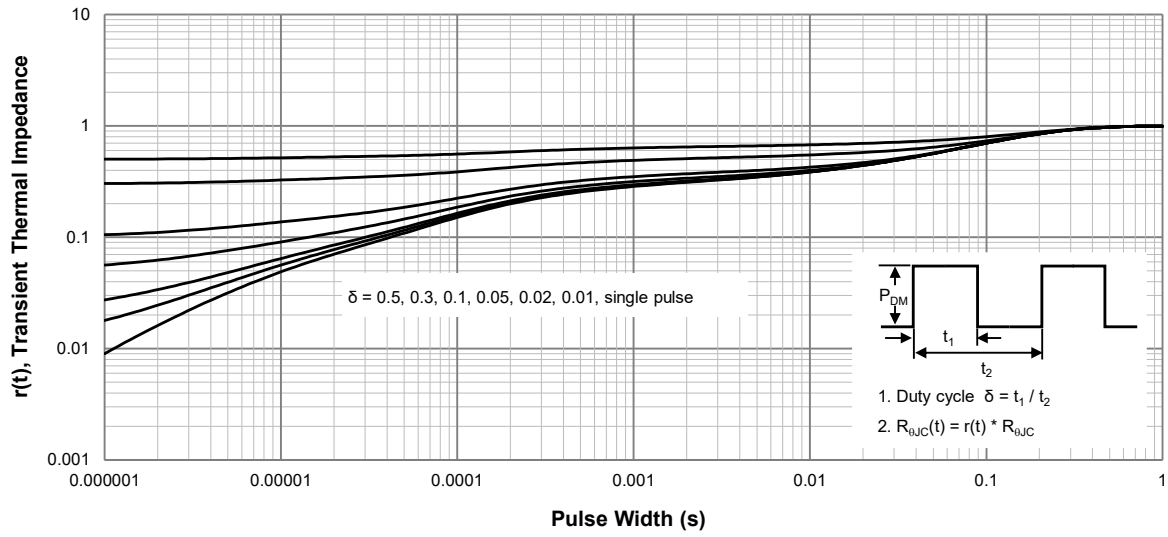
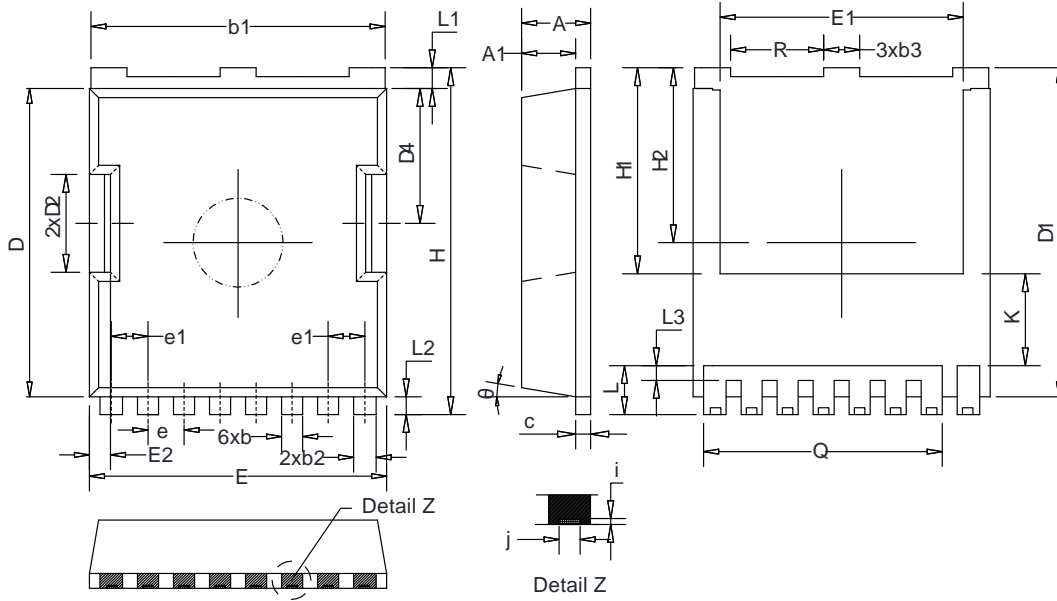


Figure 13: Normalized Maximum Transient Thermal Impedance

TOLL PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Symbol	Min	Typ	Max	Symbol	Min	Typ	Max
A	2.05	2.30	2.65	E2	0.40	0.70	0.90
A1	1.50	1.80	2.10	H	11.30	11.70	12.10
b	0.50	0.70	0.90	H1	6.95 BSC		
b_1	9.50	9.80	10.05	H2	5.90 BSC		
b_2	0.50	0.75	1.00	i	0.10 REF		
b_3	1.00	1.20	1.45	j	0.35 REF		
c	0.30	0.50	0.75	K	3.10 REF		
D	10.10	10.40	10.70	L	1.45	1.65	1.85
D_1	10.80	11.10	11.40	L1	0.50	0.70	0.90
D_2	3.10	3.30	3.50	L2	0.40	0.60	0.80
D_4	4.35	4.55	4.80	L3	0.30	0.50	0.70
e	1.20 BSC			Q	7.95 REF		
e_1	1.225 BSC			R	2.80	3.10	3.35
E	9.65	9.90	10.15	θ	10°REF		
E_1	7.80	8.10	8.50				

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