

N-Channel 120 V (D-S) MOSFET



RoHS
COMPLIANT

PRODUCT SUMMARY

V _{DS} (V)	R _{DS(on)} (mΩ) (Typ.)	I _D (A)	Q _g (Typ.)
120	2.9 at V _{GS} = 10 V	200	156 nC

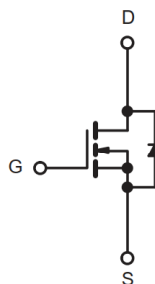
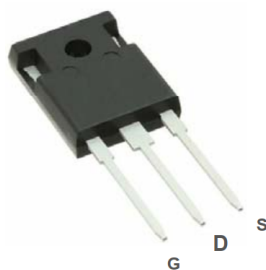
FEATURES

- DT-Trench II Power MOSFET
- 100 % R_g and UIS tested
- Extremely Low R_{DS(ON)}

APPLICATIONS

- Synchronous Rectification
- Motor Drives and Uninterruptible Power Supplies

TO-247 Pin Configuration



N-Channel MOSFET

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 = 150 °C)	I _D	T _C = 25 °C	200
		T _C = 100 °C	141
Pulsed Drain Current (t = 100 μs)	I _{DM}	800	A
Avalanche Current	I _{AS}	193	
Single Avalanche Energy ^a	E _{AS}	892	mJ
Maximum Power Dissipation ^a	P _D	T _C = 25 °C	503 ^b
		T _C = 100 °C	352.1 ^b
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) ^c	R _{thJA}	40	°C/W
Junction-to-Case (Drain)	R _{thJC}	0.3	

Notes

- Duty cycle ≤ 1 %.
- See SOA curve for voltage derating.
- When mounted on 1" square PCB (FR4 material).

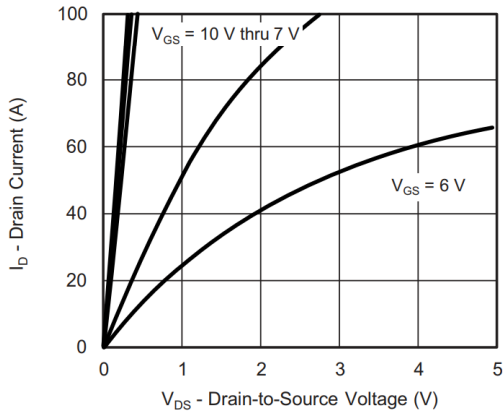
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	120	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	-	4	
Gate-Body Leakage	I _{GSS}	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 = 100 °C	-	-	50	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} = 10 V	200	-	-	A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 30 A	-	2.9	3.5	Ω
Forward Transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 30 A	-	69	-	S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 60 V, f = 1 MHz	-	10380	-	pF
Output Capacitance	C _{oss}		-	3053	-	
Reverse Transfer Capacitance	C _{rss}		-	60	-	
Total Gate Charge ^c	Q _g	V _{DS} = 60 V, V _{GS} = 10 V, I _D = 30 A	-	156	-	nC
Gate-Source Charge ^c	Q _{gs}		-	55	-	
Gate-Drain Charge ^c	Q _{gd}		-	41	-	
Gate Resistance	R _g	f = 1 MHz	-	1.5	-	Ω
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 60 V, I _D = 30 A, R _g = 6 Ω V _{GS} = 10 V	-	30	-	ns
Rise Time ^c	t _r		-	22	-	
Turn-Off Delay Time ^c	t _{d(off)}		-	99	-	
Fall Time ^c	t _f		-	36	-	
Drain-Source Body Diode Ratings and Characteristics ^b (T_C = 25 °C)						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	-	-	200	A
Pulsed Current (t = 100 μs)	I _{SM}		-	-	800	A
Forward Voltage ^a	V _{SD}	I _F = 1 A, V _{GS} = 0 V	-	-	1	V
Reverse Recovery Time	t _{rr}	I _F = 30 A, di/dt = 100 A/μs	-	56	-	ns
Reverse Recovery Charge	Q _{rr}		-	339	-	nC

Notes

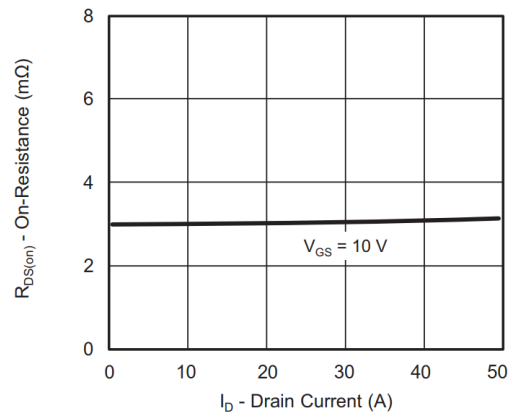
- Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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.

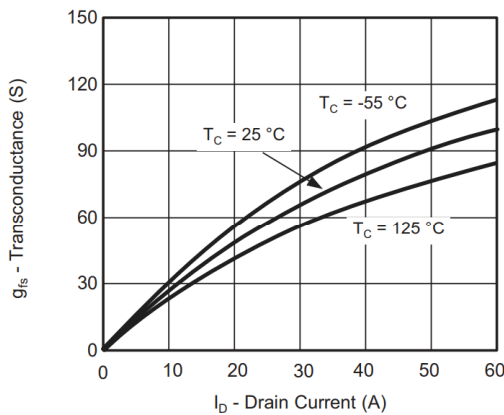
TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



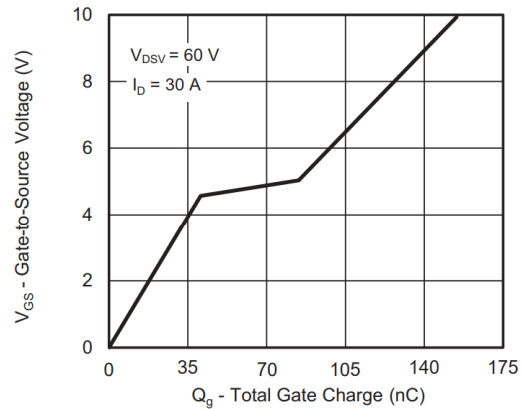
Output Characteristics



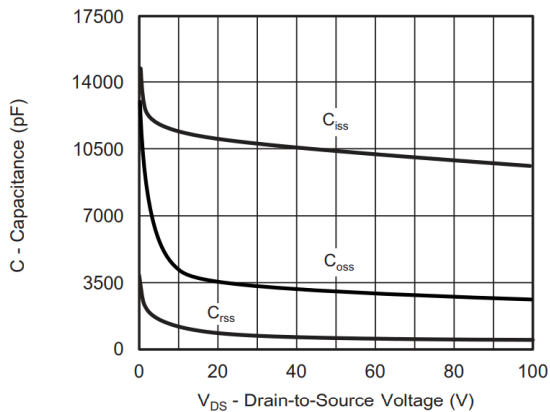
On-Resistance vs. Drain Current



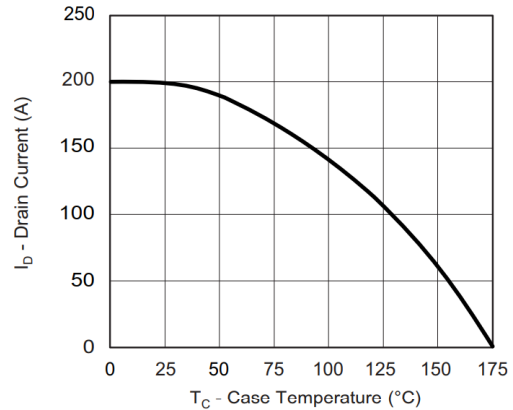
Transconductance



Gate Charge

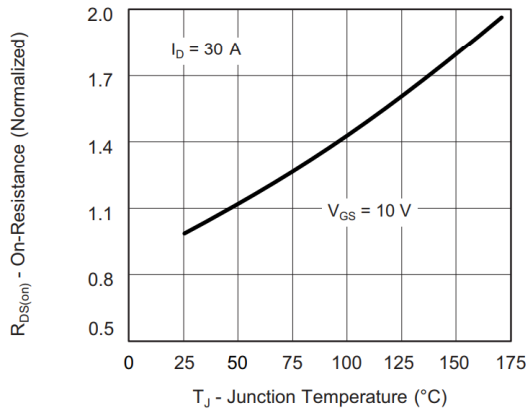


Capacitance

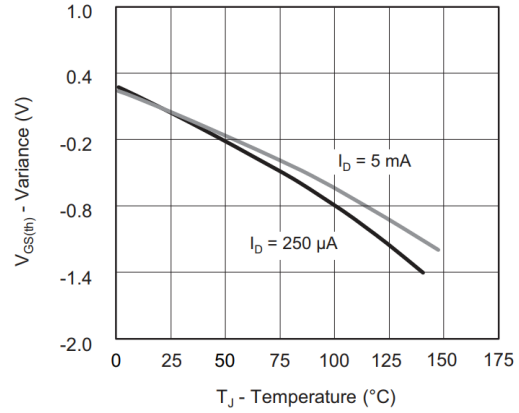


Current De-Rating

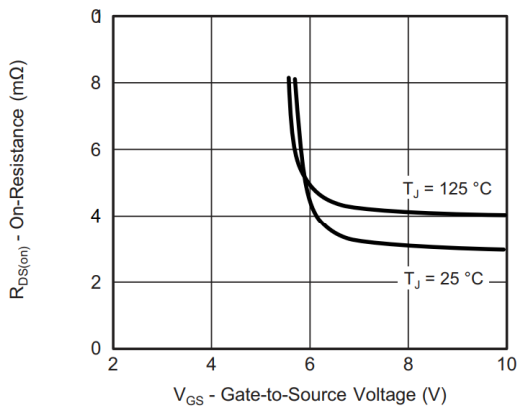
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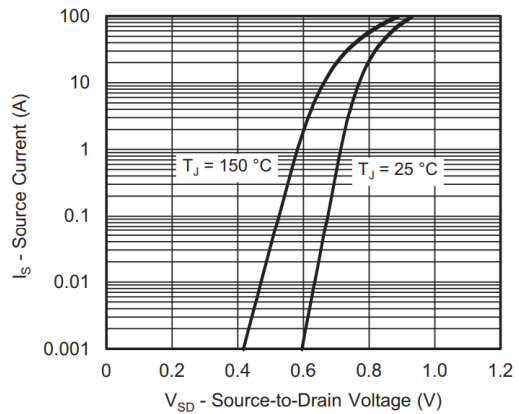
On-Resistance vs. Junction Temperature



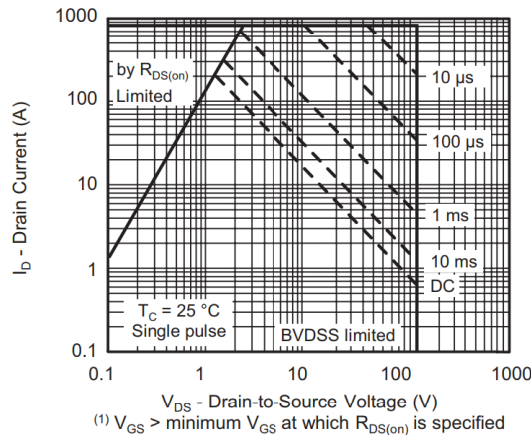
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



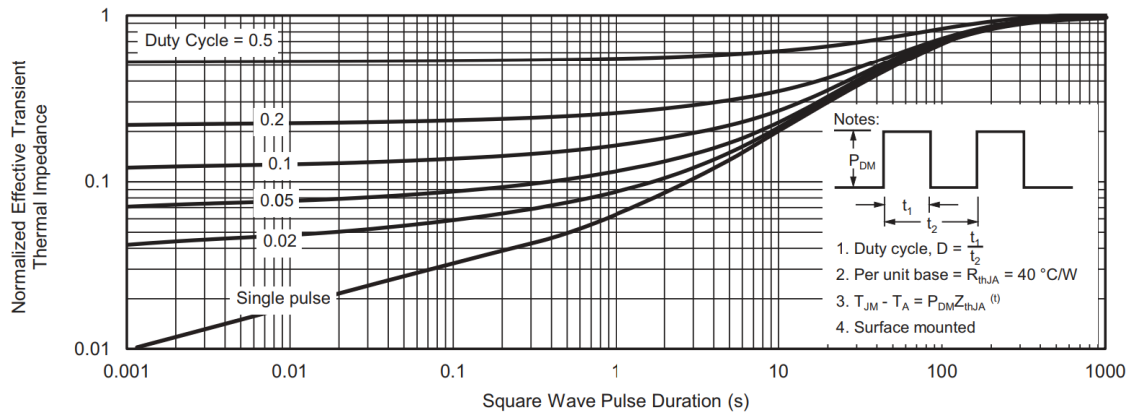
Source Drain Diode Forward Voltage



Safe Operating Area

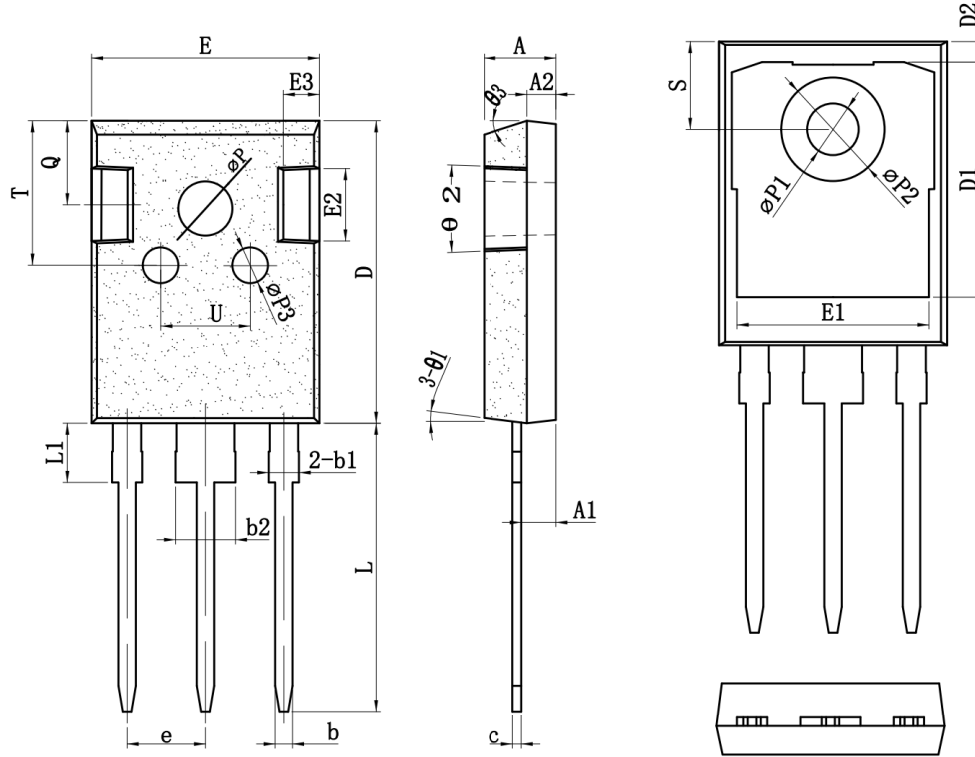
(1) $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

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



Normalized Thermal Transient Impedance, Junction-to-Ambient

TO-247_3L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX	SYMBOL	MIN	TYP	MAX
A	4.60	5.00	5.40	e	2.10	5.44	5.70
A1	2.10	2.41	2.70	L	19.00	19.98	21.00
A2	1.70	2.00	2.30	L1	-	-	4.50
b	1.00	1.20	1.40	ΦP	3.30	3.70	4.00
b1	1.80	2.10	2.40	$\Phi P1$	3.25	3.55	3.85
b2	2.80	3.10	3.40	$\Phi P2$	6.80	7.18	7.60
C	0.45	0.60	0.75	$\Phi P3$	2.30	2.50	3.30
D	19.00	21.00	23.00	Q	5.50	5.80	6.30
D1	16.00	16.55	17.00	S	5.60	6.15	6.30
D2	0.95	1.20	1.45	T	9.50	10.00	10.50
E	15.70	15.80	16.50	U	6.00	-	8.00
E1	12.80	13.25	13.70	$\theta 1$	5°	7°	9°
E2	4.20	5.00	5.30	$\theta 2$	1°	3°	5°
E3	2.20	2.50	2.80	$\theta 3$	13°	15°	17°

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