

060N10NS3-VB Datasheet

N-Channel 100-V (D-S) MOSFET

PRODUCT SUMMARY

$V_{(BR)DSS}$ (V)	$r_{DS(on)}$ (Ω)	I_D (A)
100	0.006 at $V_{GS} = 10$ V	95

FEATURES

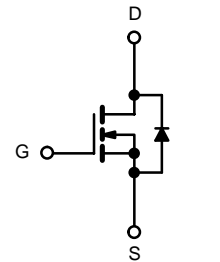
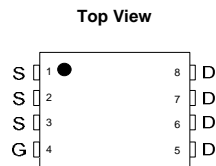
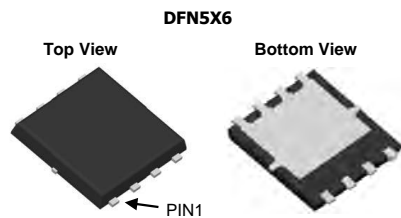
- Trench Power MOSFET
- 175 °C Junction Temperature
- Low Thermal Resistance Package
- 100 % R_g Tested



RoHS
COMPLIANT

APPLICATIONS

- Isolated DC/DC Converters



N-Channel MOSFET

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

PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current ($T_J = 150$ °C)	$T_C = 25$ °C	I_D	95	A
	$T_C = 70$ °C		85	
	$T_A = 25$ °C		30 ^{b, c}	
	$T_A = 70$ °C		25.5 ^{b, c}	
Pulsed drain current ($t = 100$ μ s)		I_{DM}	250	
Continuous source-drain diode current	$T_C = 25$ °C	I_S	70	
	$T_A = 25$ °C		6.8 ^{b, c}	
Single pulse avalanche current	$L = 0.1$ mH	I_{AS}	38	mJ
Single pulse avalanche energy		E_{AS}	50	
Maximum power dissipation	$T_C = 25$ °C	P_D	100	W
	$T_C = 70$ °C		70	
	$T_A = 25$ °C		6 ^{b, c}	
	$T_A = 70$ °C		4.2 ^{b, c}	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) ^c			260	

THERMAL RESISTANCE RATINGS

PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^b	$t \leq 10$ s	R_{thJA}	20	25	°C/W
Maximum junction-to-case (drain)	Steady state	R_{thJC}	1.6	2	

Notes

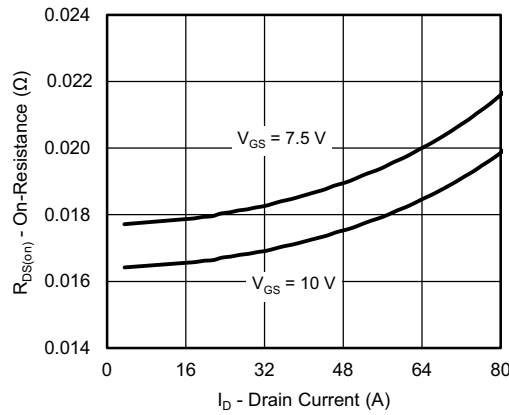
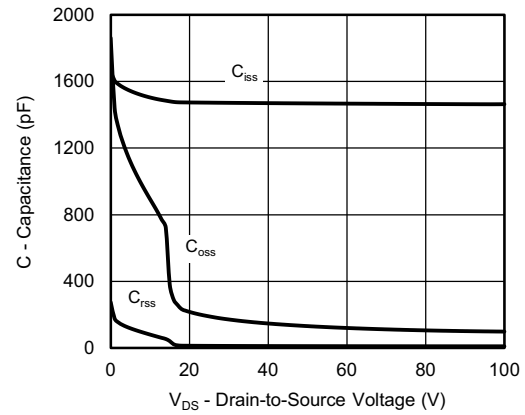
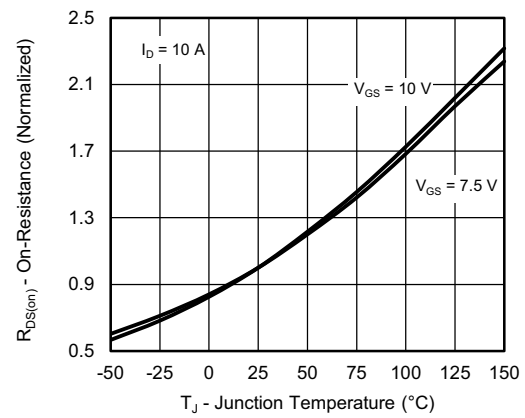
- a. Package limited
 b. Surface mounted on 1" x 1" FR4 board
 c. $t = 10$ s

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	100	-	-	V
V _{DS} temperature coefficient	ΔV _{DS} /T _J	I _D = 10 mA	-	81	-	mV/°C
V _{GS(th)} temperature coefficient	ΔV _{GS(th)} /T _J	I _D = 250 μA	-	-7.5	-	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	-	5	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} = 100 V, V _{GS} = 0 V	-	-	1	μA
		V _{DS} = 100 V, V _{GS} = 0 V, T _J = 70 °C	-	-	15	
On-state drain current ^a	I _{D(on)}	V _{DS} ≥ 10 V, V _{GS} =10 V	60	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} =10 V, I _D = 10 A	-	0.006	-	Ω
		V _{GS} = 7.5 V, I _D = 10 A	-	0.008	-	
Forward transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 10 A	-	46	-	S
Dynamic ^b						
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz	-	6500	-	pF
Output capacitance	C _{oss}		-	132	-	
Reverse transfer capacitance	C _{rss}		-	11.2	-	
Total gate charge	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 10 A	-	20	-	nC
		V _{DS} = 50 V, V _{GS} = 7.5 V, I _D = 10 A	-	15	-	
Gate-source charge	Q _{gs}		-	6.45	-	
Gate-drain charge	Q _{gd}		-	3.5	-	
Output charge	Q _{oss}	V _{DS} = 50 V, V _{GS} = 0 V	-	22	-	
Gate resistance	R _g	f = 1 MHz	0.2	0.76	1.4	Ω
Turn-on delay time	t _{d(on)}	V _{DD} = 50 V, R _L = 5 Ω, I _D ≅ 10 A, V _{GEN} = 10 V, R _g = 1 Ω	-	12	24	ns
Rise time	t _r		-	5	10	
Turn-off delay time	t _{d(off)}		-	19	38	
Fall time	t _f		-	5	10	
Turn-on delay time	t _{d(on)}	V _{DD} = 50 V, R _L = 5 Ω, I _D ≅ 10 A, V _{GEN} = 7.5 V, R _g = 1 Ω	-	15	30	
Rise time	t _r		-	6	12	
Turn-off delay time	t _{d(off)}		-	19	38	
Fall time	t _f		-	5	10	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I _S	T _C = 25 °C	-	-	70	A
Pulse diode forward current	I _{SM}		-	-	80	
Body diode voltage	V _{SD}	I _S = 5 A, V _{GS} = 0 V	-	0.78	1.1	V
Body diode reverse recovery time	t _{rr}	I _F = 10 A, di/dt = 100 A/μs, T _J = 25 °C	-	43	86	ns
Body diode reverse recovery charge	Q _{rr}		-	72	144	nC
Reverse recovery fall time	t _a		-	33	-	ns
Reverse recovery rise time	t _b		-	10	-	

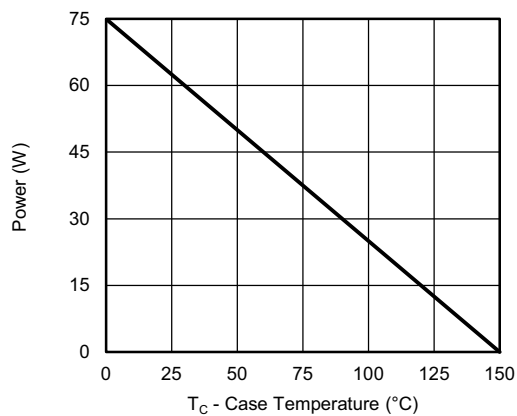
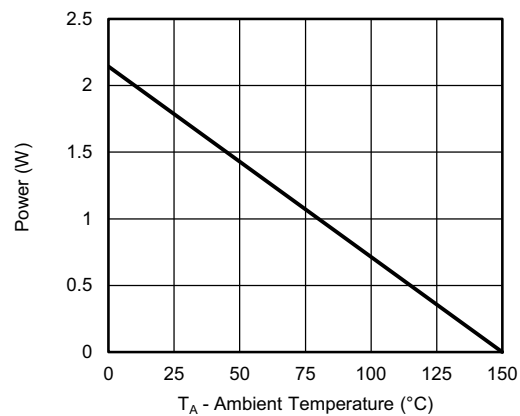
Notes

- 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.

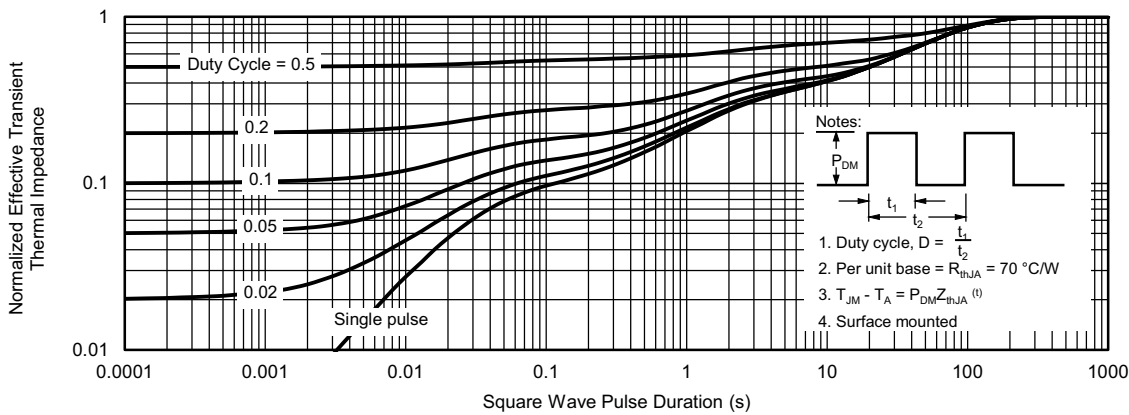
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)**Output Characteristics****Transfer Characteristics****On-Resistance vs. Drain Current and Gate Voltage****Capacitance****Gate Charge****On-Resistance vs. Junction Temperature**

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

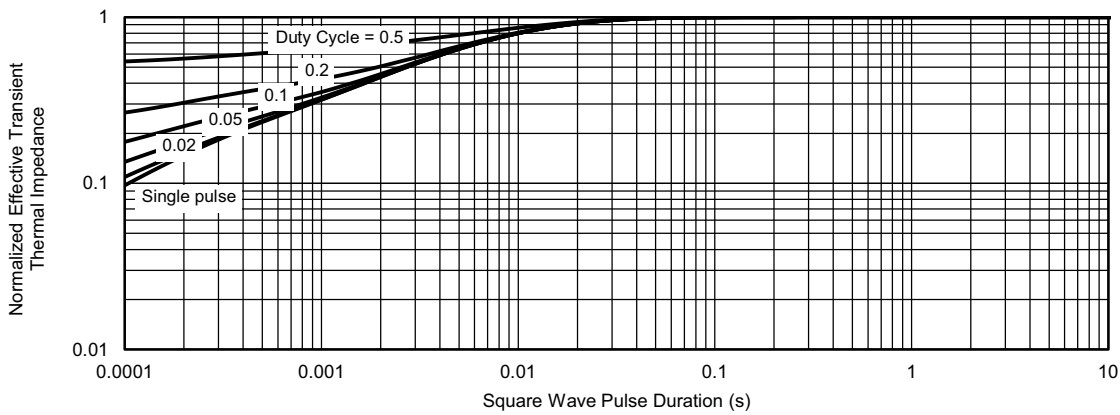
Current Derating ^a

Power, Junction-to-Case

Power, Junction-to-Ambient
Note

- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit

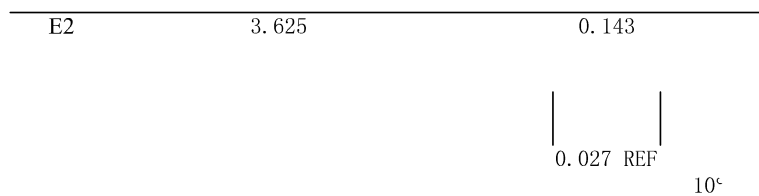
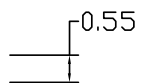
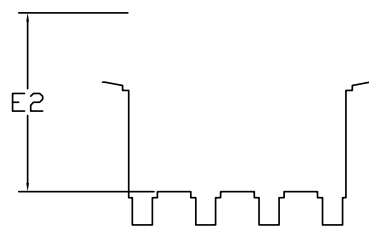
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case



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