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ON Semiconductor®

## FDN5632N-F085

### N-Channel Logic Level PowerTrench® MOSFET

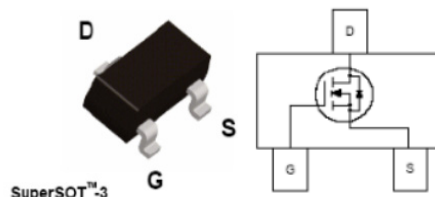
60 V, 1.6 A, 98 mΩ

#### Features

- $R_{DS(on)}$  = 98 mΩ at  $V_{GS} = 4.5$  V,  $I_D = 1.6$  A
- $R_{DS(on)}$  = 82 mΩ at  $V_{GS} = 10$  V,  $I_D = 1.7$  A
- Typ  $Q_{g(TOT)}$  = 9.2 nC at  $V_{GS} = 10$  V
- Low Miller Charge
- UIS Capability
- Qualified to AEC Q101
- RoHS Compliant

#### Applications

- DC/DC converter
- Motor Drives



#### MOSFET Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{DSS}$	Drain to Source Voltage	60	V
$V_{GS}$	Gate to Source Voltage	$\pm 20$	V
$I_D$	Drain Current Continuous ( $V_{GS} = 10\text{V}$ )	1.7	A
	Pulsed	10	
$E_{AS}$	Single Pulse Avalanche Energy (Note 1)	74	mJ
$P_D$	Power Dissipation	1.1	W
$T_J, T_{STG}$	Operating and Storage Temperature	-55 to +150	$^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	75	$^\circ\text{C/W}$
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-252, 1in <sup>2</sup> copper pad area	111	$^\circ\text{C/W}$

#### Note:

1:  $E_{AS}$  of 74mJ is 100% test at  $L=80\text{mH}$ ,  $I_{AS}=1.4\text{A}$ , starting  $T_J = 25^\circ\text{C}$

#### Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
5632	FDN5632N-F085	SSOT3	7"	8mm	3000 units

FDN5632N-F085 N-Channel Logic Level PowerTrench® MOSFET

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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**Off Characteristics**

$B_{VDSS}$	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 48\text{V}$ , $V_{GS} = 0\text{V}$	-	-	1	$\mu\text{A}$
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	nA

**On Characteristics**

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$ , $I_D = 250\mu\text{A}$	1	2.0	3	V
$r_{DS(on)}$	Drain to Source On Resistance	$I_D = 1.7\text{A}$ , $V_{GS} = 10\text{V}$	-	57	82	m $\Omega$
		$I_D = 1.6\text{A}$ , $V_{GS} = 6\text{V}$	-	62	88	
		$I_D = 1.6\text{A}$ , $V_{GS} = 4.5\text{V}$	-	70	98	
		$I_D = 1.7\text{A}$ , $V_{GS} = 10\text{V}$ , $T_A = 150^\circ\text{C}$	-	107	135	

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	$V_{DS} = 15\text{V}$ , $V_{GS} = 0\text{V}$ , $f = 1\text{MHz}$	-	475	-	pF	
$C_{oss}$	Output Capacitance		-	60	-	pF	
$C_{riss}$	Reverse Transfer Capacitance		-	30	-	pF	
$R_G$	Gate Resistance	$f = 1\text{MHz}$	-	1.4	-	$\Omega$	
$Q_{g(TOT)}$	Total Gate Charge at 10V	$V_{GS} = 0$ to 10V	$V_{DD} = 20\text{V}$ $I_D = 1.7\text{A}$	-	9.2	12	nC
$Q_{gs}$	Gate to Source Gate Charge			-	1.5	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge			-	1.4	-	nC

**Electrical Characteristics**  $T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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**Switching Characteristics**

$t_{on}$	Turn-On Time	$V_{DD} = 30\text{V}$ , $I_D = 1.0\text{A}$ $V_{GS} = 10\text{V}$ , $R_{GEN} = 6\Omega$	-	-	30	ns
$t_{d(on)}$	Turn-On Delay Time		-	15	-	ns
$t_r$	Rise Time		-	1.7	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	5.2	-	ns
$t_f$	Fall Time		-	1.3	-	ns
$t_{off}$	Turn-Off Time		-	-	12.9	ns

**Drain-Source Diode Characteristics**

$V_{SD}$	Source to Drain Diode Voltage	$I_{SD} = 1.7\text{A}$	-	0.8	1.25	V
		$I_{SD} = 0.85\text{A}$	-	0.8	1.0	
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 1.7\text{A}$ , $dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	16.0	21	ns
$Q_{rr}$	Reverse Recovery Charge		-	7.9	10.3	nC

### Typical Characteristics

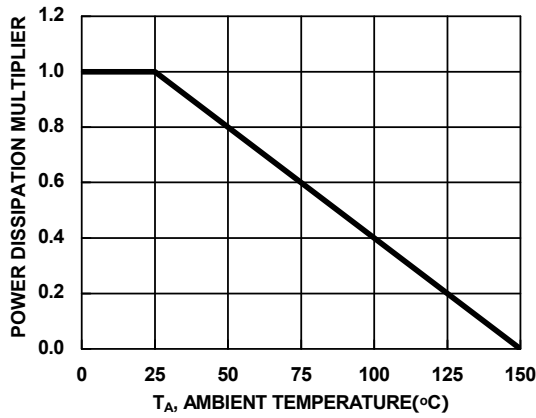


Figure 1. Normalized Power Dissipation vs. Case Temperature

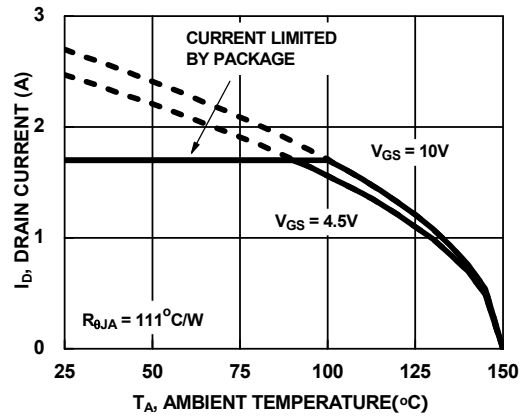


Figure 2. Maximum Continuous Drain Current vs. Case Temperature

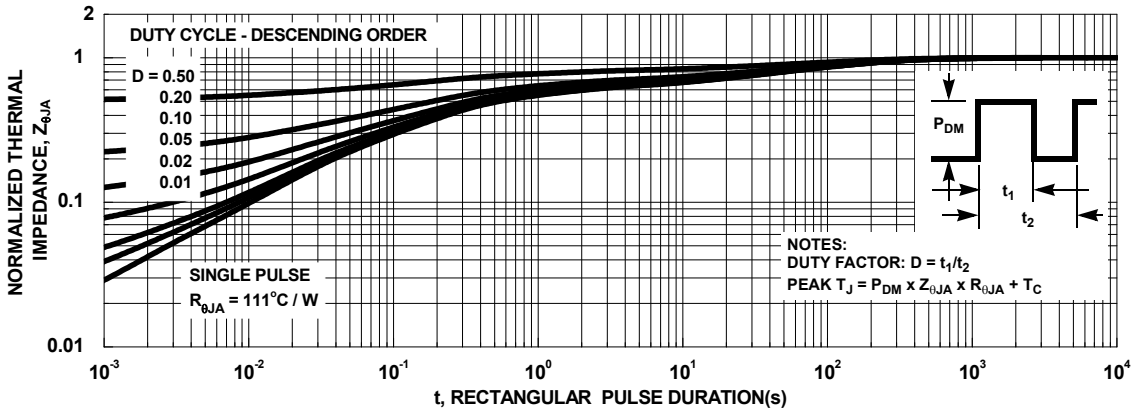


Figure 3. Normalized Maximum Transient Thermal Impedance

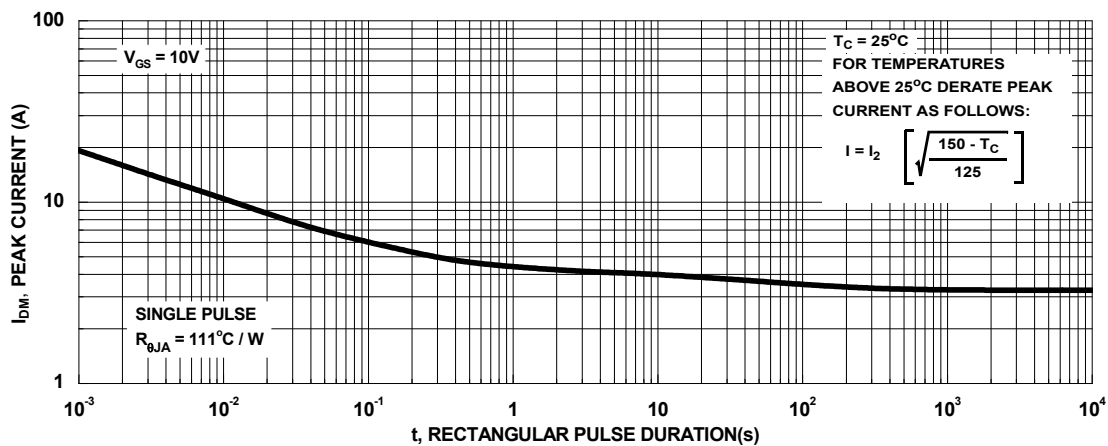


Figure 4. Peak Current Capability

## Typical Characteristics

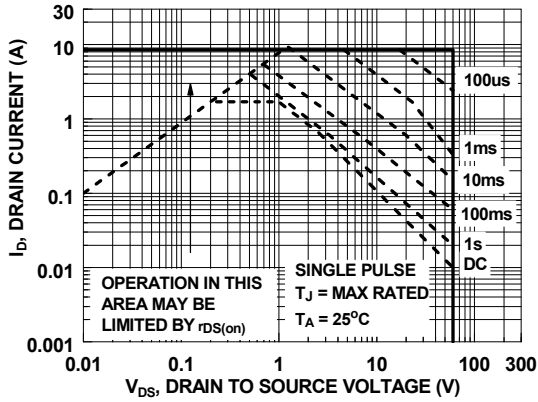


Figure 5. Forward Bias Safe Operating Area

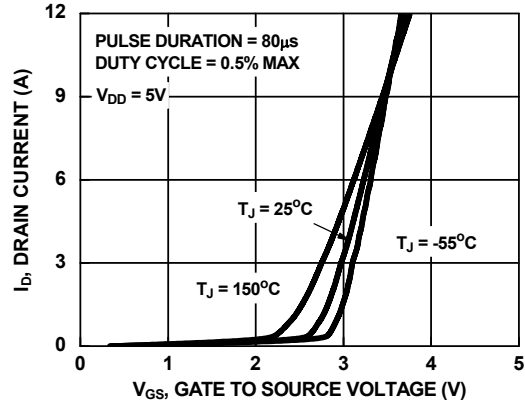


Figure 6. Transfer Characteristics

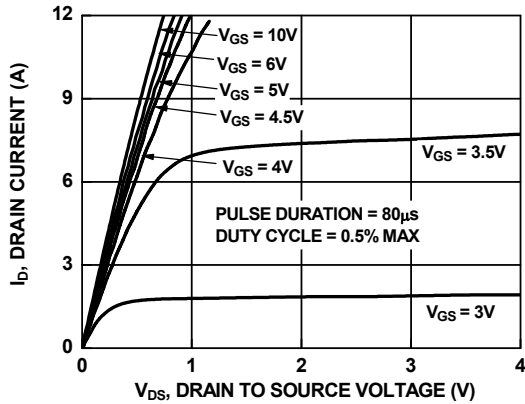


Figure 7. Saturation Characteristics

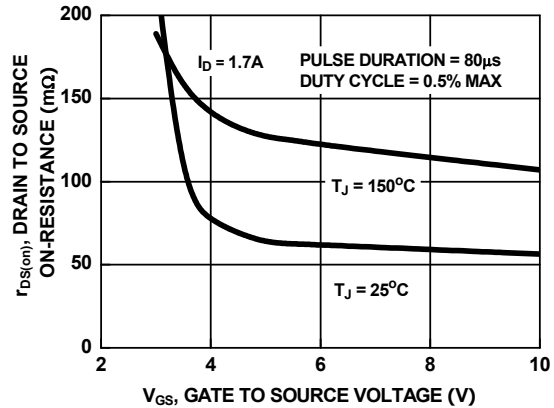


Figure 8. Drain to Source On-Resistance Variation vs Gate to Source Voltage

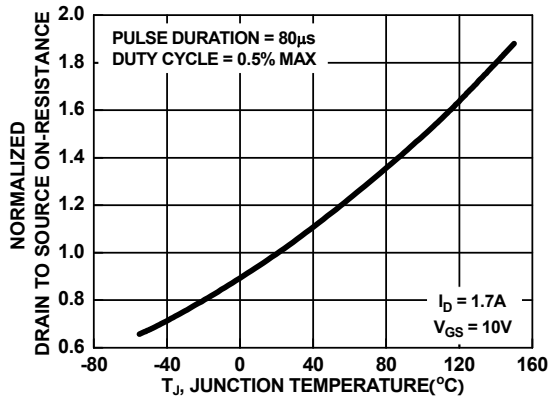


Figure 9. Normalized Drain to Source On-Resistance vs Junction Temperature

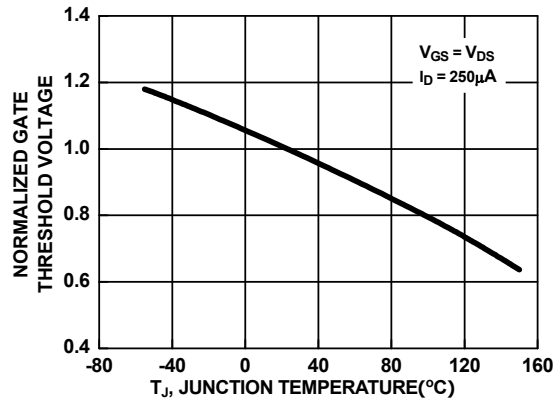


Figure 10. Normalized Gate Threshold Voltage vs Junction Temperature

## Typical Characteristics

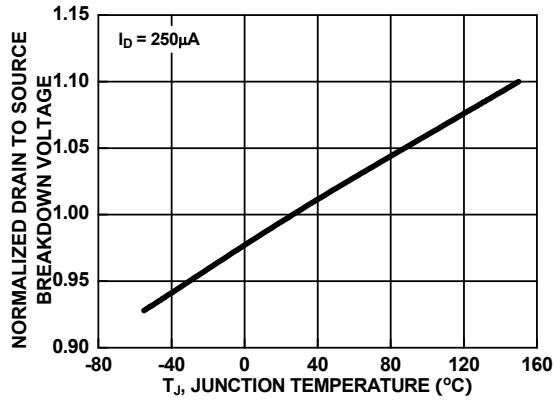


Figure 11. Normalized Drain to Source Breakdown Voltage vs Junction Temperature

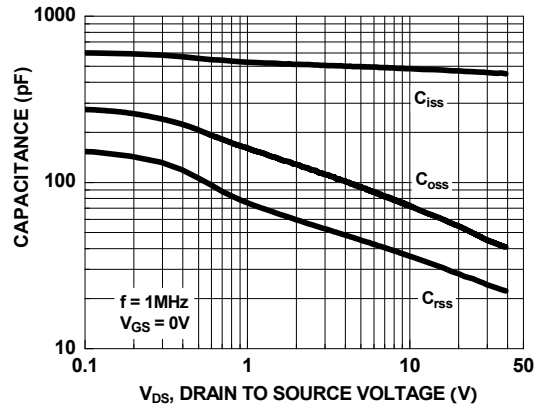


Figure 12. Capacitance vs Drain to Source Voltage

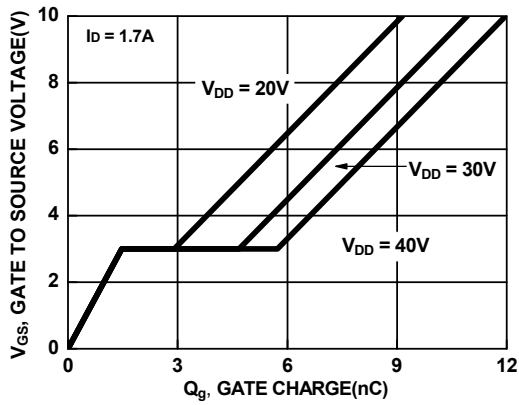


Figure 13. Gate Charge vs Gate to Source Voltage

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