

N-Channel MOSFET

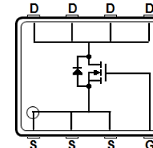
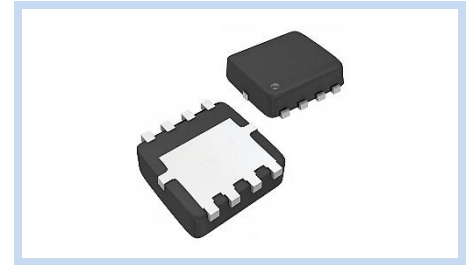
100V 45A DFN3x3 AEC-Q101

MFT10N45D33A

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FEATURE

- $R_{DS(ON)} < 12.5m\Omega$, $V_{GS}=10V$, $I_D=22.5A$
- $R_{DS(ON)} < 16m\Omega$, $V_{GS}=4.5V$, $I_D=20A$
- High Density Cell Design for Low $R_{d(Son)}$
- Application: DC/DC Converter, High-Frequency Switching and Synchronous Rectification
- AEC-Q101 Qualified

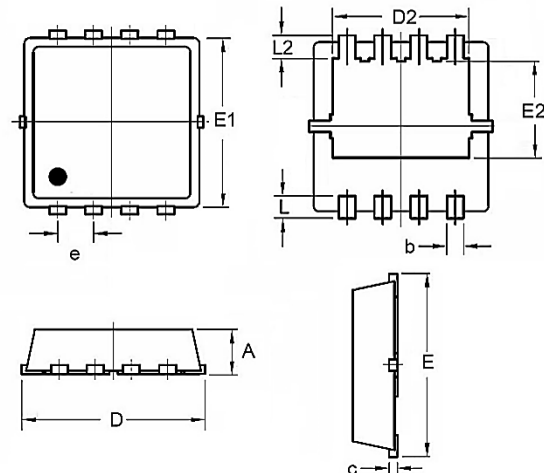


MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$T_C = 25^\circ C$	I_D	45	A
	$T_C = 100^\circ C$		28	
Drain Current – Pulsed		I_{DM}	170	A
Power Dissipation	$T_C = 25^\circ C$	P_D	46	W
Avalanche Energy		E_{AS}	100	mJ
Thermal Resistance, Junction to Case		$R_{\theta JC}$	2.7	$^\circ C/W$
Thermal Resistance, Junction to Ambient		$R_{\theta JA}$	60	$^\circ C/W$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to +150	$^\circ C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.70	0.90
b	0.20	0.40
c	0.20 (BSC)	
D	3.15	3.35
D2	2.20	2.50
e	0.65 (BSC)	
E	3.15	3.35
E2	1.80	2.00
L	0.35	0.55
L2	0.35 (BSC)	



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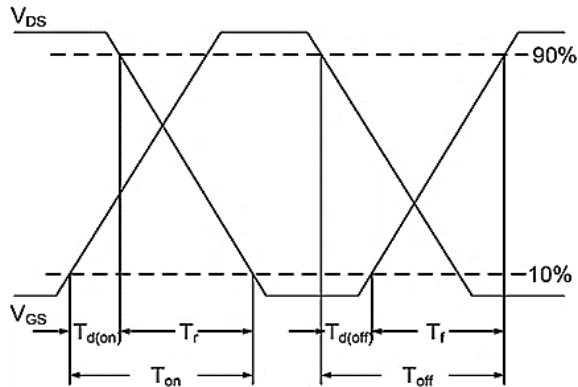
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	100	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=100V, V_{GS}=0V$	I_{DSS}	--	--	1	μA
Gate-Body Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	I_{GSS}	--	--	± 100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=22.5A$	$R_{DS(ON)}$	--	10	12.5	m Ω
	$V_{GS}=10V, I_D=20A$		--	10	12.5	
	$V_{GS}=4.5V, I_D=20A$		--	12.5	16	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1.0	1.7	3.0	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=50V, V_{GS}=10V, I_D=25A$	Q_g	--	30	--	nC
Gate-Source Charge		Q_{gs}	--	9	--	
Gate-Drain Charge		Q_{gd}	--	4	--	
Turn-On Delay Time	$V_{DD}=50V, V_{GS}=10V, R_{GEN}=3\Omega, I_D=25A$	$T_{d(on)}$	--	13	--	nS
Rise Time		T_r	--	52	--	
Turn-Off Delay Time		$T_{d(off)}$	--	26	--	
Fall Time		T_f	--	77	--	
Input Capacitance	$V_{DS}=50V, V_{GS}=0V, f=1MHz$	C_{iss}	--	1800	--	pF
Output Capacitance		C_{oss}	--	590	--	
Reverse Transfer Capacitance		C_{rss}	--	20	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	45	A
Diode Forward Voltage	$V_{GS}=0V, I_S=22.5A$	V_{SD}	--	--	1.2	V
Reverse Recovery Time	$I_F=25A, di/dt=100A/\mu s$	t_{rr}	--	35	--	nS
Reverse Recovery Charge		Q_{rr}	--	26	--	nC

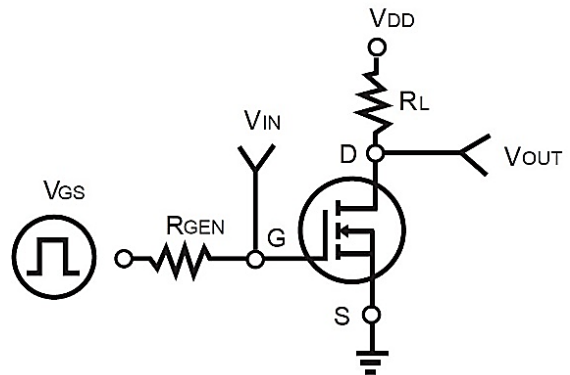
Note:

1. Repetitive rating, pulsed width limited by junction temperature.
2. EAS condition: $T_J=25^\circ C, I_{AS}=20A, V_G=10V, L=0.5mH, R_G=25\Omega$
3. P_D is based on max. junction temperature, using junction-case thermal resistance.
4. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. copper in still air environment ($T_A=25^\circ C$). The maximum allowed temperature of $150^\circ C$. The value in any give application based on the user's specific board design.
5. Guaranteed by design, not subject to production testing.

Switching Time Waveform



Switching Test Circuit



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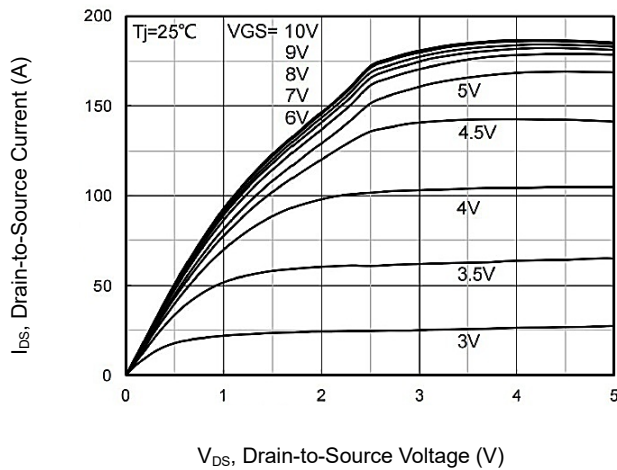
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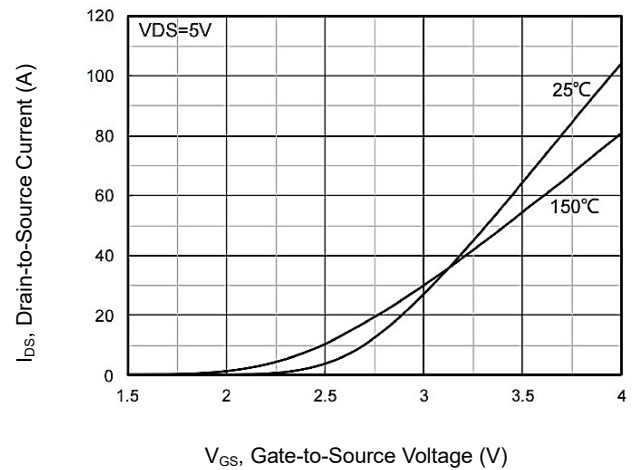
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CHARACTERISTIC CURVES

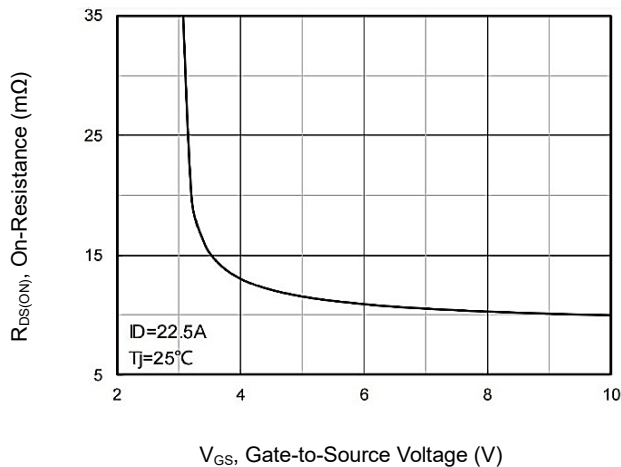
Output Characteristics



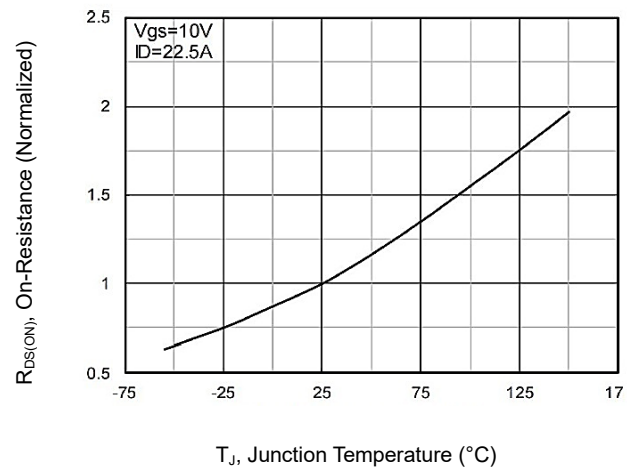
Transfer Characteristics



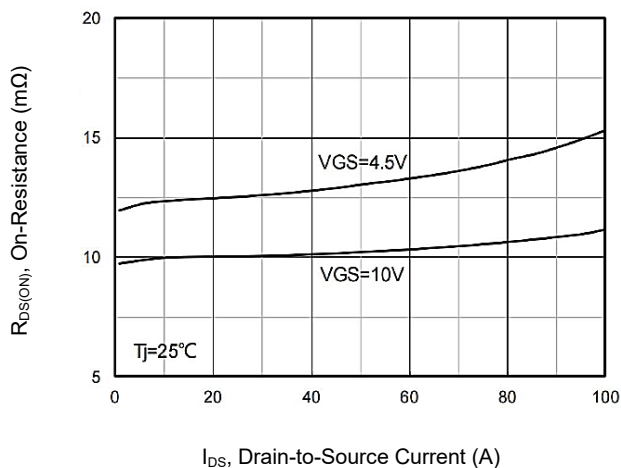
On-Resistance vs. Gate-to-Source Voltage



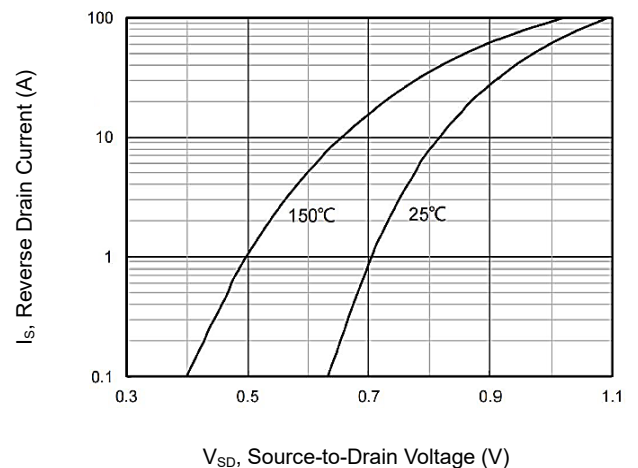
On-Resistance vs. Junction Temperature



On-Resistance vs. Drain Current



Body Diode Characteristics



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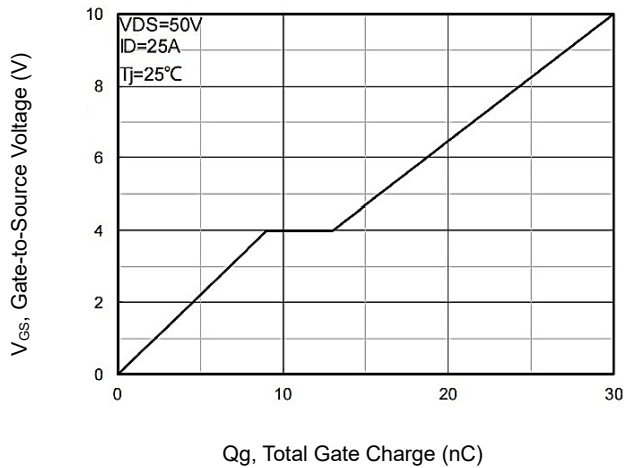
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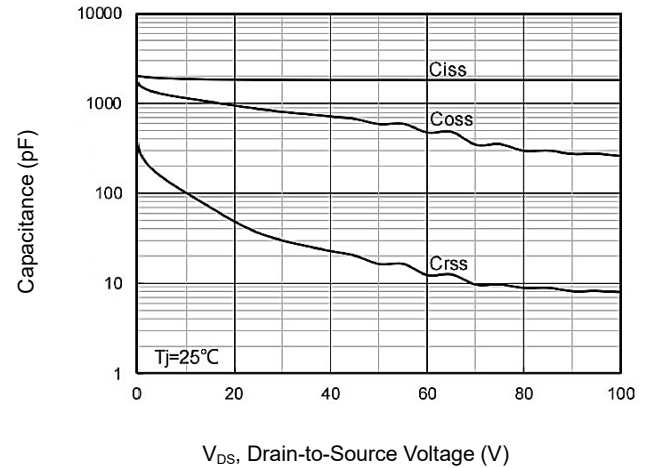
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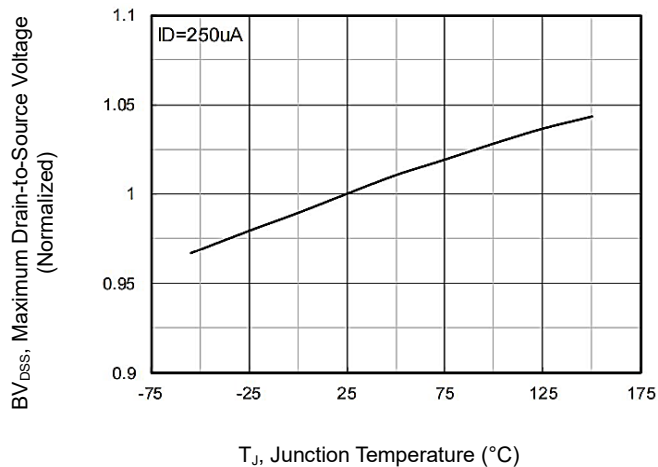
Gate Charge Characteristics



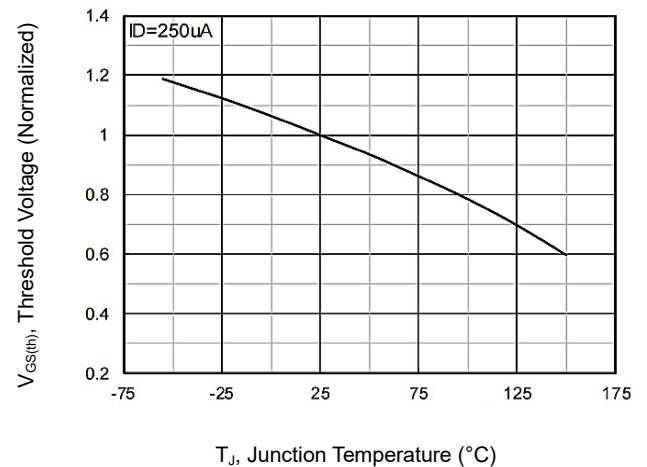
Capacitance



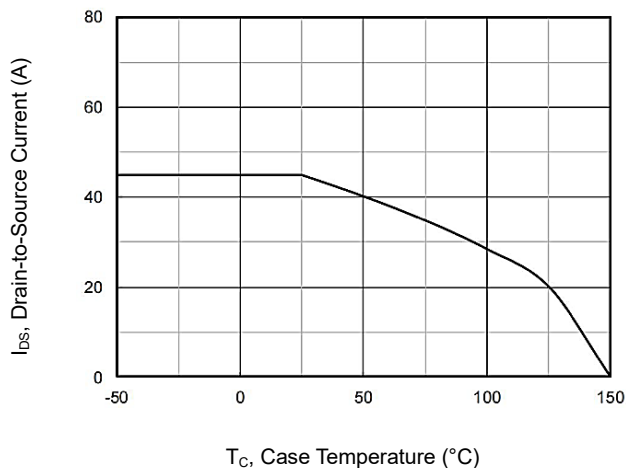
Normalized Breakdown Voltage



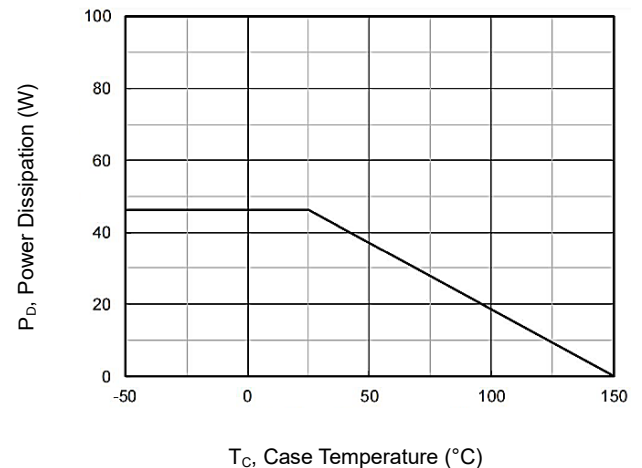
Normalized Threshold Voltage



Drain Current Dissipation



Power Dissipation



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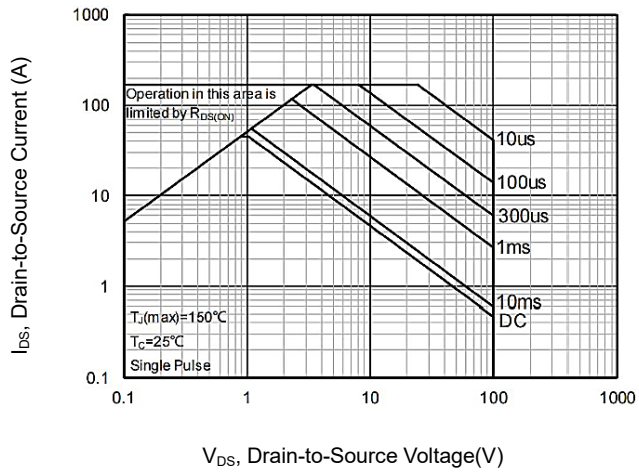
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CHARACTERISTIC CURVES

Maximum Safe Operating Area



Maximum Transient Thermal Impedance

