

P-Channel MOSFET

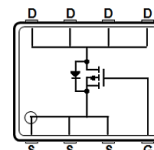
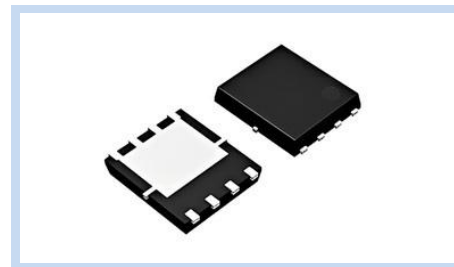
60V 30A 69W DFN3x3 AEC-Q101

MFT6P30D33A

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FEATURE

- $R_{DS(ON)} < 24m\Omega$, $V_{GS} = -10V$, $I_D = -20A$
- $R_{DS(ON)} < 33m\Omega$, $V_{GS} = -4.5V$, $I_D = -10A$
- High Density Cell Design for Low RDS(ON)
- Application: DC/DC Converter, High-Frequency Switching and Synchronous Rectification
- AEC-Q101 Qualified

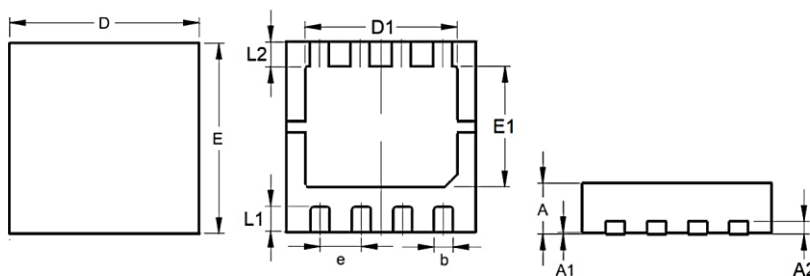


MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$T_C = 25^\circ C$	I_D	-30	A
	$T_C = 100^\circ C$		-19	
Drain Current – Pulsed		I_{DM}	-120	A
Power Dissipation	$T_C = 25^\circ C$	P_D	69	W
Single Pulse Avalanche Energy		E_{AS}	100	mJ
Thermal Resistance Junction to Case		$R_{\theta JC}$	1.8	$^\circ C/W$
Operating Junction and Storage Temperature		T_J, T_{STG}	-55 to +150	$^\circ C$

DIMENSIONS

Item	Min. (mm)	Max. (mm)
A	0.70	1.00
A1	0.00	0.10
A2	0.20 BSC	
b	0.20	0.40
D	3.15	3.35
D1	2.20	2.50
e	0.65 BSC	
E	3.15	3.35
E1	1.80	2.00
L1	0.35	0.55
L2	0.35 BSC	



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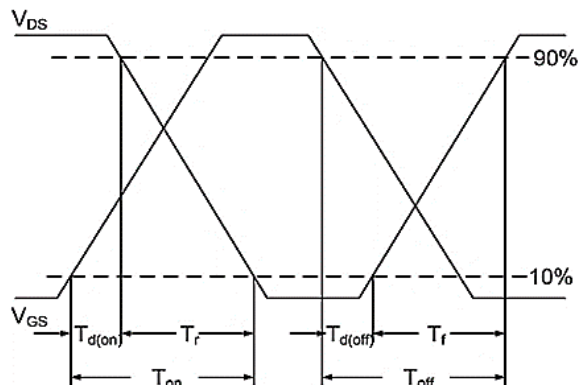
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	BV_{DSS}	-60	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=-60V, V_{GS}=0V$	I_{DSS}	--	--	-1	μA
Gate-Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	I_{GSS}	--	--	± 100	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-20A$	$R_{DS(ON)}$	--	18	24	m Ω
	$V_{GS}=-4.5V, I_D=-10A$		--	24	33	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	$V_{GS(th)}$	-1	-2	-3	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=-30V, V_{GS}=-10V, I_D=-15A$	Q_g	--	61	--	nC
Gate-Source Charge		Q_{gs}	--	17	--	
Gate-Drain Charge		Q_{gd}	--	7	--	
Turn-On Delay Time	$V_{DS}=-30V, V_{GS}=-10V, R_G=4.5\Omega, I_D=-15A$	$T_{d(on)}$	--	62	--	nS
Rise Time		T_r	--	79	--	
Turn-Off Delay Time		$T_{d(off)}$	--	376	--	
Fall Time		T_f	--	161	--	
Input Capacitance	$V_{DS}=-30V, V_{GS}=0V, f=1MHz$	C_{iss}	--	4300	--	pF
Output Capacitance		C_{oss}	--	170	--	
Reverse Transfer Capacitance		C_{rss}	--	150	--	
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	-30	A
Diode Forward Voltage	$V_{GS}=0V, I_S=-20A$	V_{SD}	--	--	-1.2	V
Reverse Recovery Time	$I_S=-15A, di/dt=100A/\mu s$	t_{rr}	--	29	--	nS
Reverse Recovery Charge		Q_{rr}	--	38	--	nC

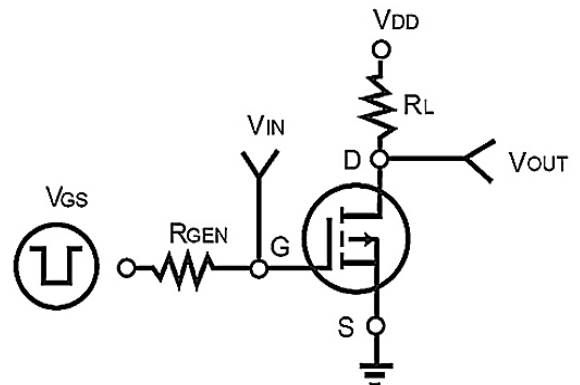
Note:

1. Repetitive rating, pulsed width limited by maximum junction temperature.
2. EAS condition: $T_J=25^\circ C, V_{DD}=-40V, V_G=-10V, L=0.5mH, I_{AS}=-20A$.
3. P_D is based on max. junction temperature, using junction-case and junction-ambient thermal resistance.
4. Guaranteed by design, not subject to production testing.

Switching Time Waveform



Switching Test Circuit



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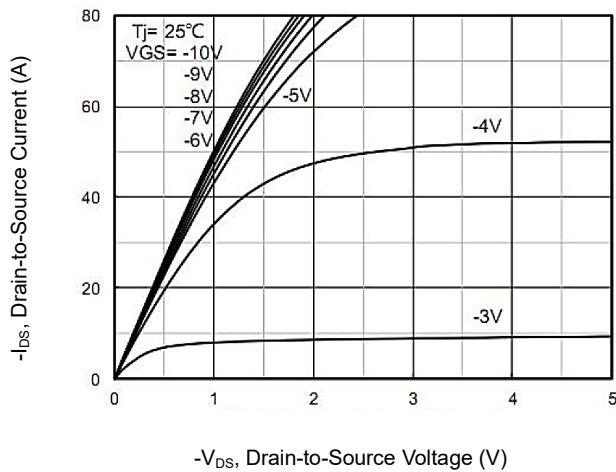
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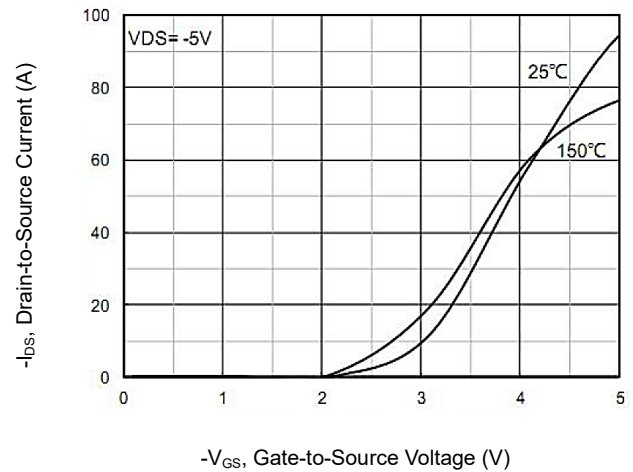
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CHARACTERISTIC CURVES

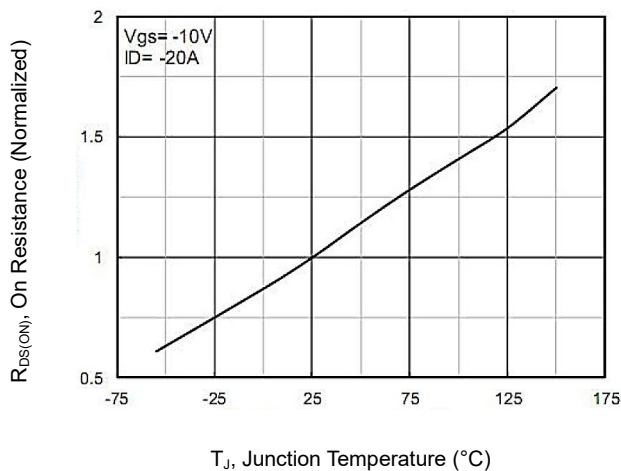
Output Characteristics



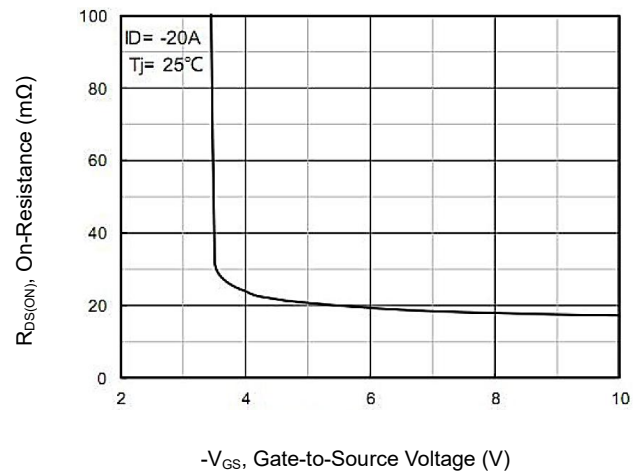
Transfer Characteristics



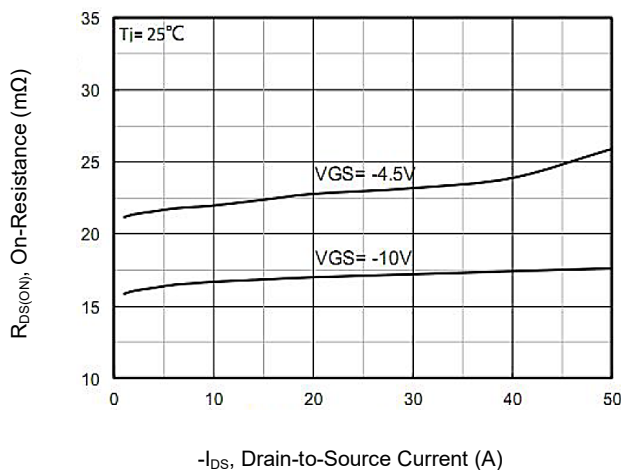
On-Resistance vs. Temperature



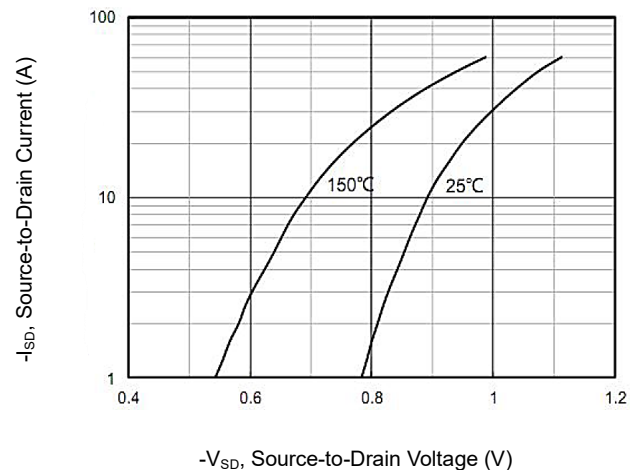
On-Resistance vs. Gate-to-Source Voltage



On-Resistance vs. Drain Current

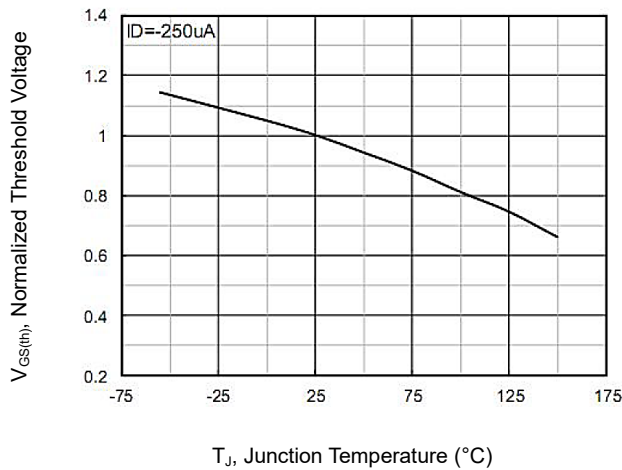


Body Diode Characteristics

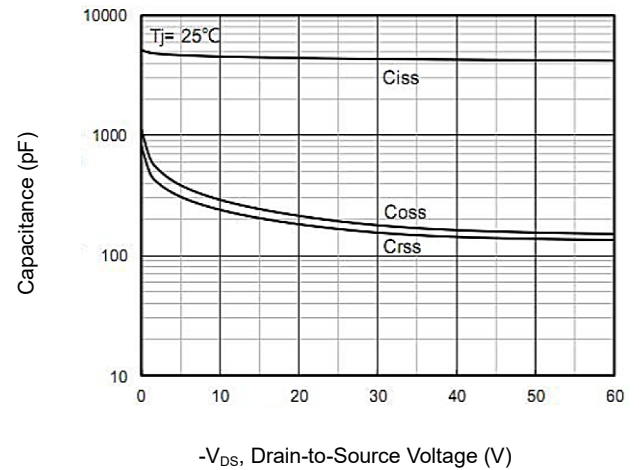


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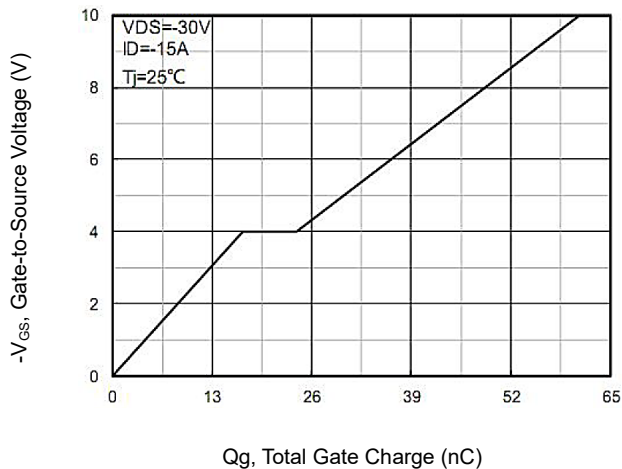
Threshold Voltage vs. Temperature



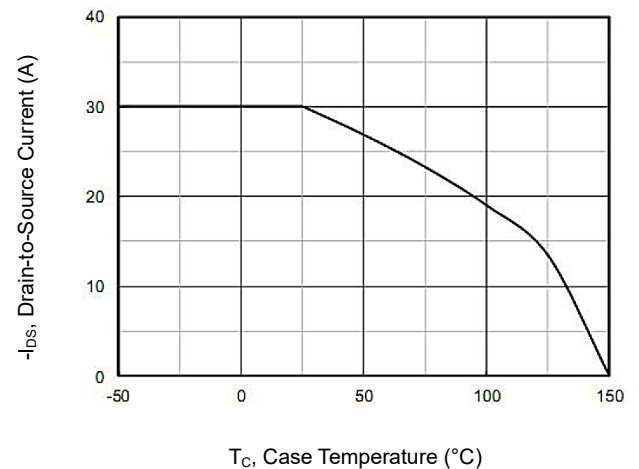
Capacitance



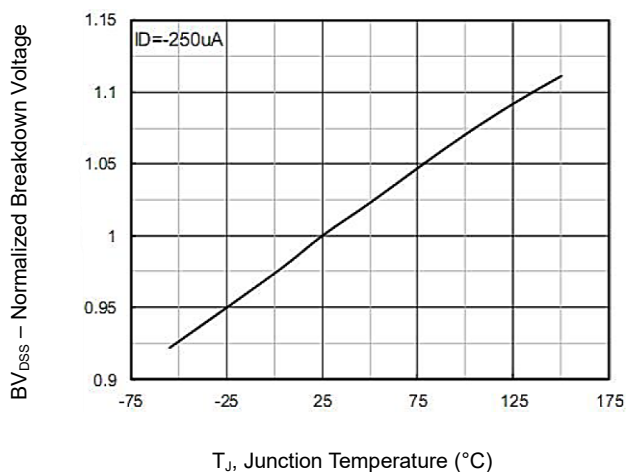
Gate Charge Characteristics



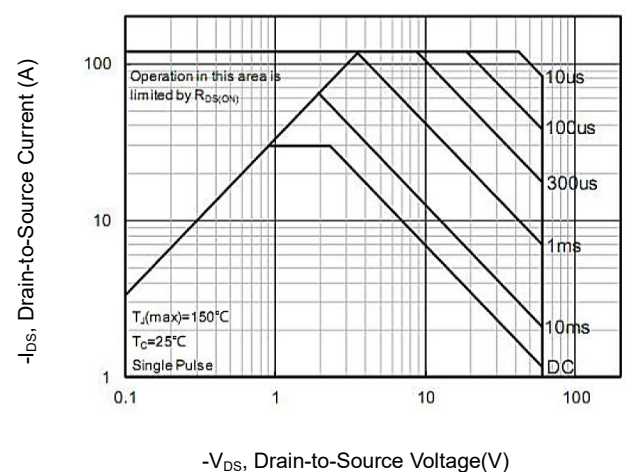
Maximum Drain Current vs. Temperature



Breakdown Voltage vs. Temperature



Maximum Safe Operating Area



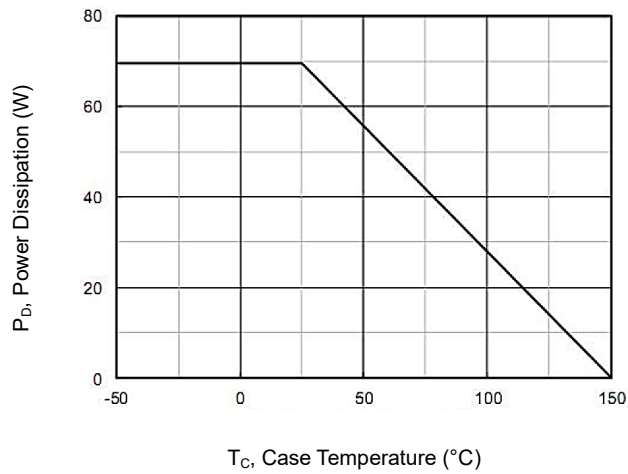
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CHARACTERISTIC CURVES

Power Derating Curve



Maximum Transient Thermal Impedance

