

N-Channel MOSFET

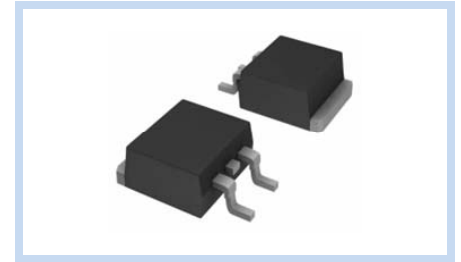
60V 45A TO-252 AEC-Q101

MFT6N45T252A

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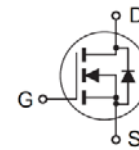
FEATURE

- $R_{DS(ON)} < 12m\Omega$, $V_{GS}=10V$, $I_D=20A$
- $R_{DS(ON)} < 15m\Omega$, $V_{GS}=4.5V$, $I_D=15A$
- Improved dv/dt capability
- Low reverse transfer capacitance
- AEC-Q101 Qualified



MECHANICAL DATA

- Case: TO-252 Package
- Terminals: Solderable per MIL-STD-750, Method 2026



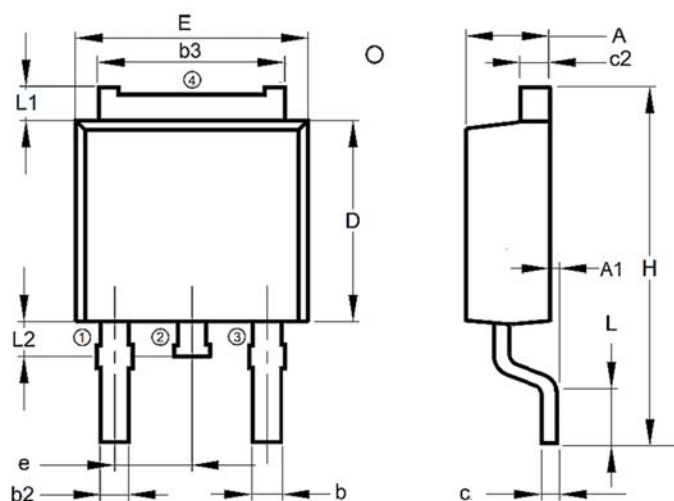
MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous	I_D	$T_c=25^\circ C$	45
		$T_c=100^\circ C$	29
Drain Current – Pulsed	I_{DM}	180	A
Power Dissipation	P_D	$T_c=25^\circ C$	75
		$T_c=100^\circ C$	37
Single Pulse Avalanche Energy	E_{AS}	61	mJ
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	110	$^\circ C/W$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.0	$^\circ C/W$
Operating Junction and Storage Temperature	T_J, T_{STG}	-55 to 175	$^\circ C$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	2.39	2.18
A1	--	0.13
b	0.89	0.64
b2	0.89	0.64
b3	5.46	4.95
c	--	0.508
c2	0.89	0.46
D	6.22	5.97
E	6.73	6.35
e	--	2.29
H	8.80	10.60
L	1.78	1.40
L1	1.27	0.89
L2	0.89	0.64

Note: 1: Gate, 2, 4: Drain, 3: Source



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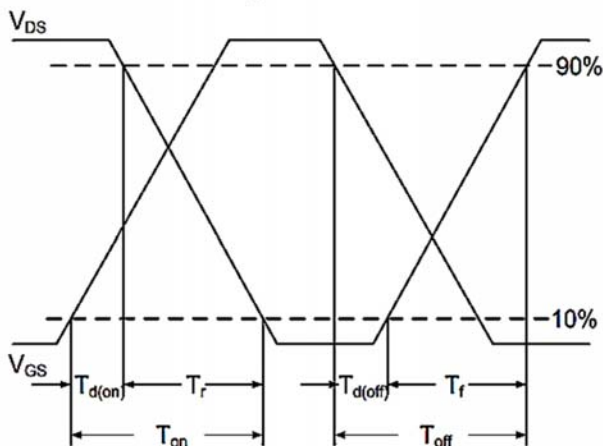
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	60	--	--	V
Drain-Source Leakage Current	$V_{DS}=60V, V_{GS}=0V$	I_{DSS}	--	--	1	μA
Gate-Source 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	$V_{GS}=10V, I_D=20A$	$R_{DS(ON)}$	--	10.5	12	m Ω
	$V_{GS}=4.5V, I_D=15A$		--	12	15	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	$V_{GS(th)}$	1	1.7	2.5	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=30V, V_{GS}=10V, I_D=10A$	Q_g	--	39	--	nC
Gate-Source Charge		Q_{gs}	--	6.1	--	nC
Gate-Drain Charge		Q_{gd}	--	6.7	--	nC
Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=6\Omega, I_D=10A$	$T_{d(on)}$	--	7.5	--	ns
Rise Time		T_r	--	36	--	ns
Turn-Off Delay Time		$T_{d(off)}$	--	49	--	ns
Fall Time		T_f	--	12	--	ns
Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1MHz$	C_{iss}	--	2256	--	pF
Output Capacitance		C_{oss}	--	145	--	pF
Reverse Transfer Capacitance		C_{rss}	--	93	--	pF
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Diode Forward Current	--	I_S	--	--	45	A
Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ C$	V_{SD}	--	0.67	1	V

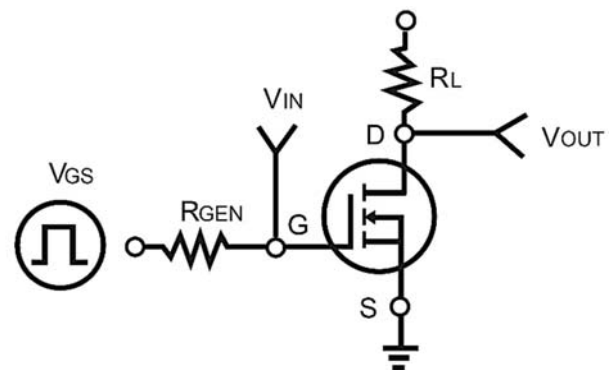
Note:

1. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature $T_{J(max)}=150^\circ C$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ C$.
4. The Maximum current rating is package limited.
5. $R_{\theta JA}$ is the sum of the junction-to-case and case-to ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch² with 2oz square pad of copper.
6. Guaranteed by design, not subject to production testing.

Switching Time Waveform



Switching Test Circuit



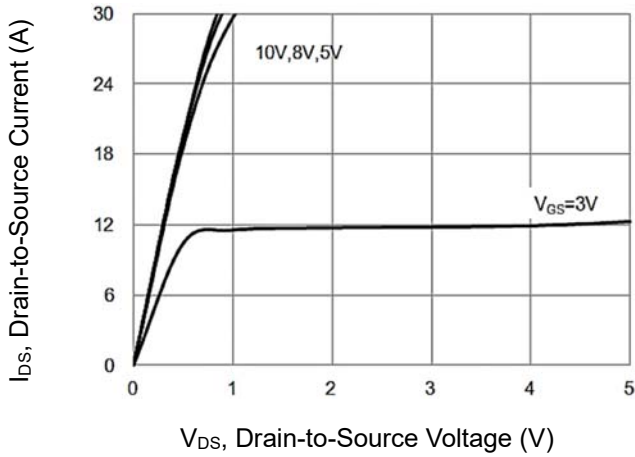
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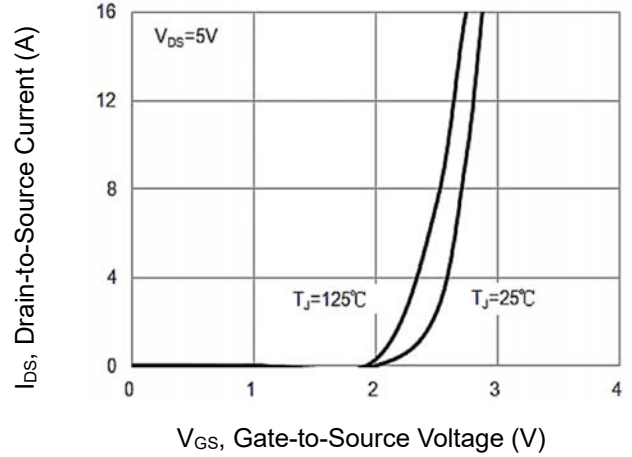
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CHARACTERISTIC CURVES

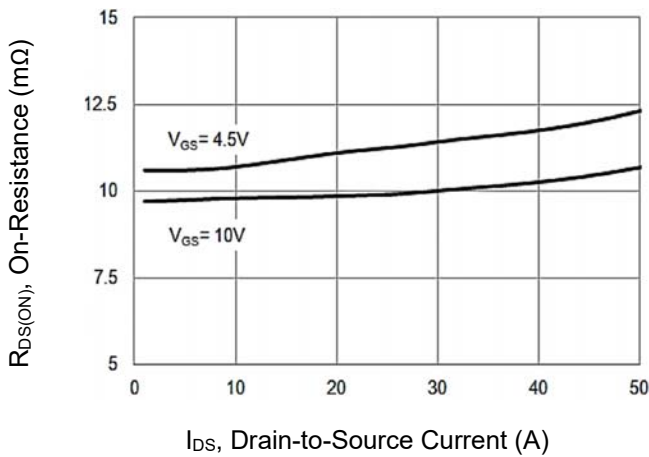
Output Characteristics



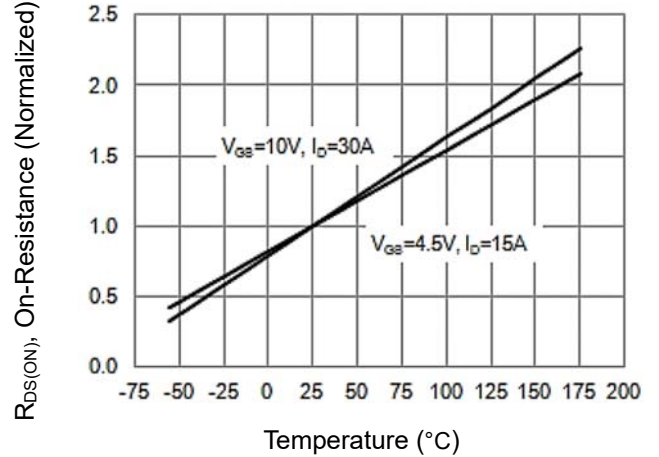
Transfer Characteristics



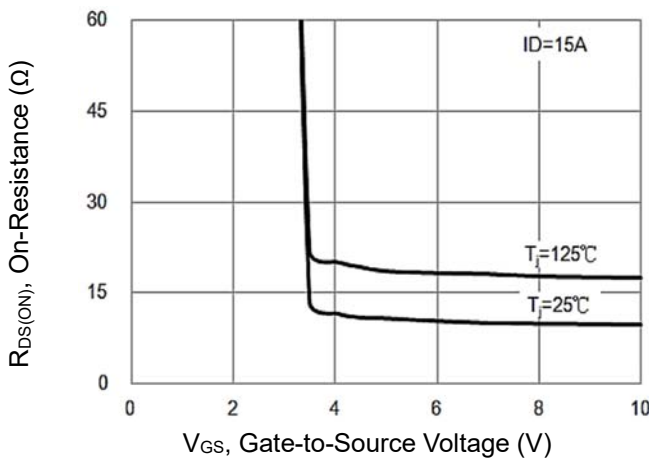
On-Resistance vs. Drain Current



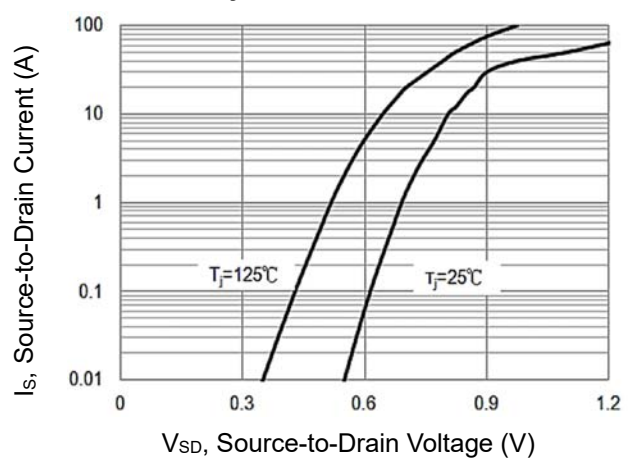
On-Resistance vs. Junction temperature



On-Resistance Variation with VGS



Body Diode Characteristics



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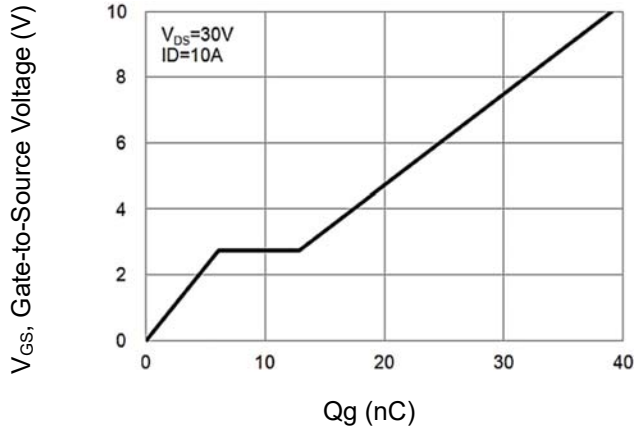
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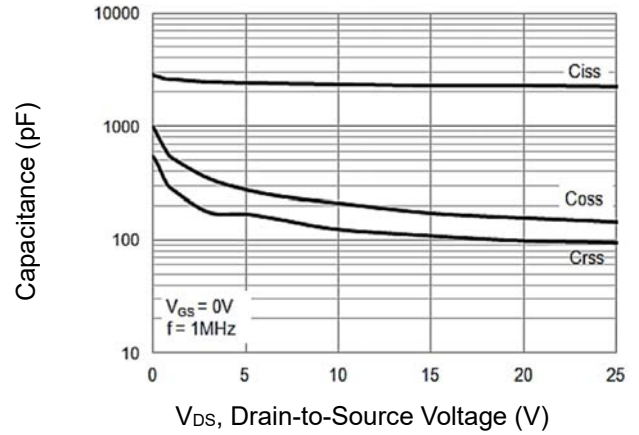
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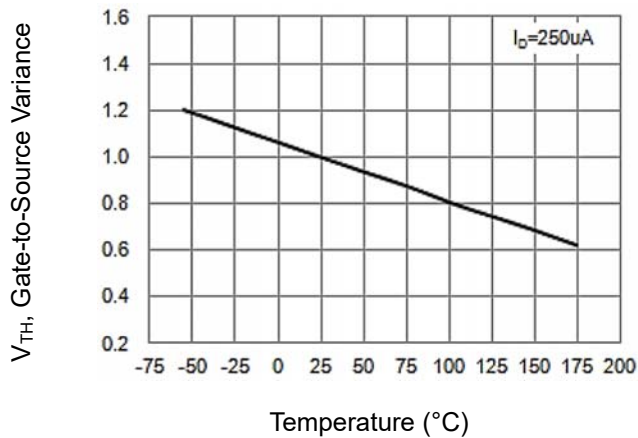
Gate-Charge Characteristics



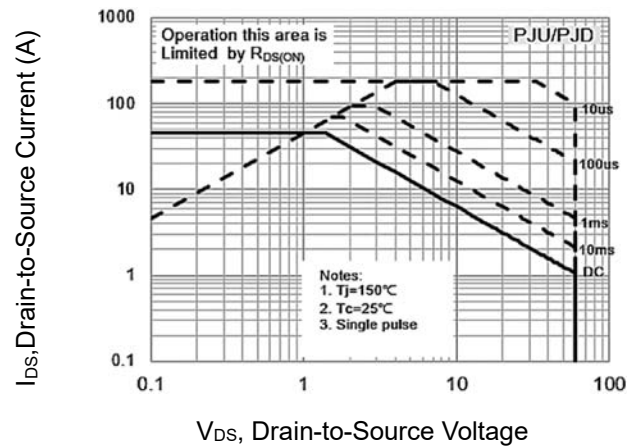
Capacitance vs. Drain-Source Voltage



Threshold Voltage Variation with Temperature



Maximum Safe Operating Area



Normalized Transient Thermal Impedance vs Pulse Width

