

N-Channel MOSFET

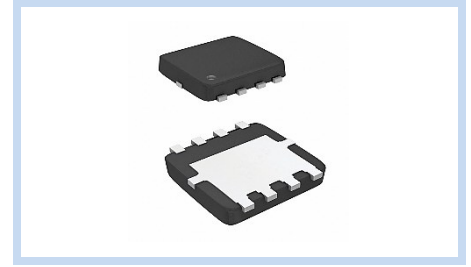
40V 64A DFN3333-8L AEC-Q101

MFT4N64D33A

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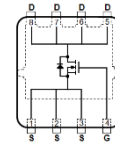
FEATURE

- $R_{DS(ON)} < 5.6m\Omega$ at $V_{GS}=10V$
- $R_{DS(ON)} < 7.9m\Omega$ at $V_{GS}=4.5V$
- Excellent Drive
- Logic Level Drive
- Application: DC-DC Conversion, Power Routing, Motor Drives
- AEC-Q101 Compliant



MECHANICAL DATA

- Case: DFN3333-8L package
- Terminal: Solderable per MIL-STD-750, Method 2026

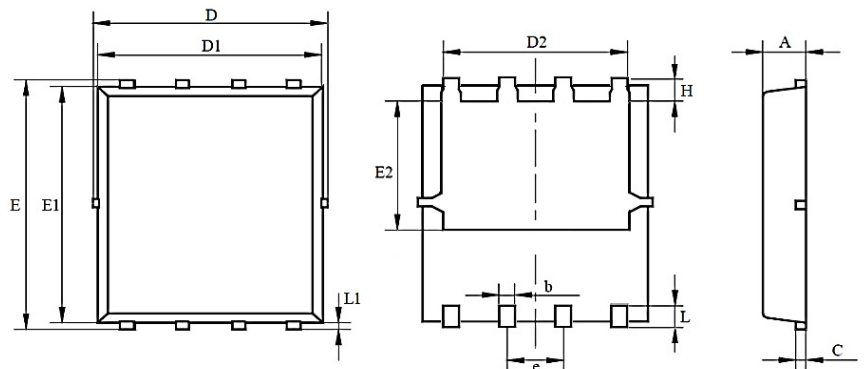


MAXIMUM RATINGS

Parameter, $T_A=25^\circ\text{C}$		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	V
Drain Current – Continuous	$T_C=25^\circ\text{C}$	I_D	64	A
	$T_C=100^\circ\text{C}$		45	
	$T_A=25^\circ\text{C}$		15.7	
	$T_A=70^\circ\text{C}$		13.2	
Drain Current – Pulsed	$T_C=25^\circ\text{C}$	I_{DM}	256	A
Power Dissipation	$T_C=25^\circ\text{C}$	P_D	42	W
	$T_C=100^\circ\text{C}$		21	
	$T_A=25^\circ\text{C}$		2.5	
	$T_A=70^\circ\text{C}$		1.8	
Single Pulse Avalanche Energy		E_{AS}	81	mJ
Typical Thermal Resistance	Junction to Case	$R_{\theta JC}$	3.6	$^\circ\text{C/W}$
	Junction to Ambient	$R_{\theta JA}$	60	
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~175	$^\circ\text{C}$

DIMENSIONS

Item	Min (mm)	Max (mm)
A	0.70	0.80
b	0.25	0.35
c	0.10	0.25
D	3.30	
D1	3.00	3.20
D2	-	2.59
E	3.30	
E1	3.00	3.20
E2	-	1.98
e	0.65 BSC	
L	0.30	0.56
L1	0.05	0.15
H	0.30	0.56



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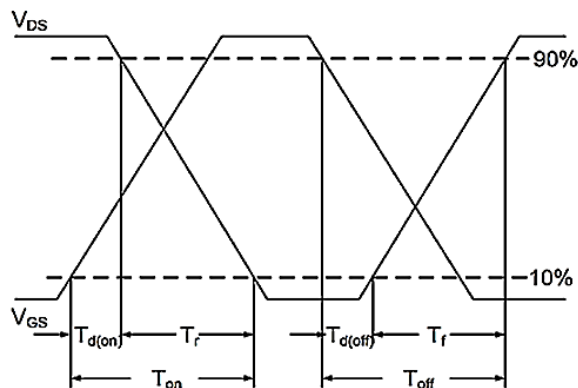
ELECTRICAL CHARACTERISTICS

Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	BV_{DSS}	40	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=40V, V_{GS}=0V$	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	$V_{GS}=10V, I_D=15A$	$R_{DS(ON)}$	--	4.5	5.6	m Ω
	$V_{GS}=4.5V, I_D=10A$		--	6.1	7.9	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=50\mu A$	$V_{GS(th)}$	1.1	1.6	2.3	V
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=32V, I_D=15A$ $V_{GS}=10V$	Q_g	--	20	--	nC
Gate-Source Charge		Q_{gs}	--	3.1	--	
Gate-Drain Charge		Q_{gd}	--	6.4	--	
Turn-On Delay Time	$V_{DS}=32V, I_D=15A$ $V_{GS}=10V, R_G=3\Omega$	$T_{d(on)}$	--	11	--	ns
Rise Time		T_r	--	3	--	
Turn-Off Delay Time		$T_{d(off)}$	--	28	--	
Fall Time		T_f	--	5	--	
Input Capacitance	$V_{DS}=25V, V_{GS}=0V$ $f=1MHz$	C_{iss}	--	1320	--	pF
Output Capacitance		C_{oss}	--	250	--	
Reverse Transfer Capacitance		C_{rss}	--	30	--	
Gate Resistance	$f=1MHz$	R_g	--	0.8	--	Ω
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Continuous Source Current	$T_C=25^\circ C$	I_S	--	--	64	A
Pulse Source Current		I_{SM}	--	--	256	A
Diode Forward Voltage	$V_{GS}=0V, I_S=20A$	V_{SD}	--	0.85	1.3	V
Reverse Recovery Time	$V_{GS}=0V, I_S=20A$ $dI_S/dt=100A/\mu s$	T_{rr}	--	23	--	ns
Reverse Recovery Charge		Q_{rr}	--	15	--	nC

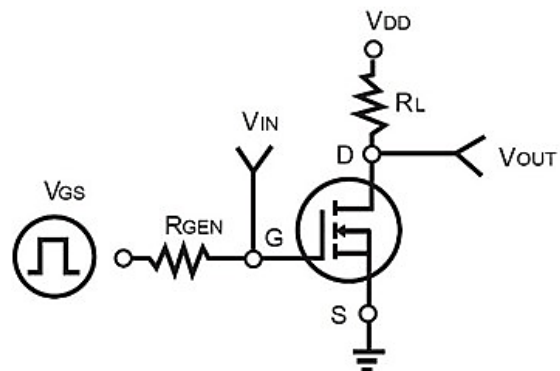
Note:

1. Pulse width $<100\mu s$, Duty cycle $<2\%$
2. Chip capability with $R_{\theta JC}=3.6^\circ C/W$
3. $R_{\theta JA}$ 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.
4. Test condition is $L=0.5mH, I_{AS}=18A, V_{GS}=10V, V_{DD}=30V$, starting $T_J=25^\circ C$

Switching Time Waveform

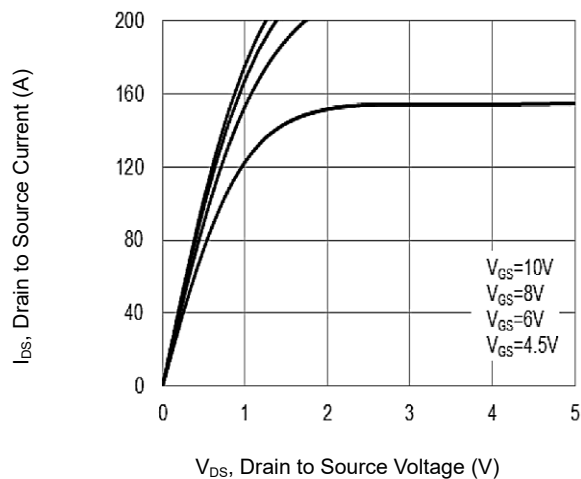


Switching Test Circuit

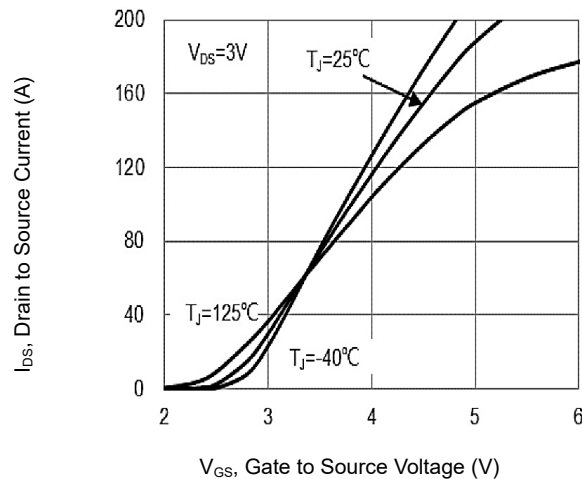


CHARACTERISTIC CURVES

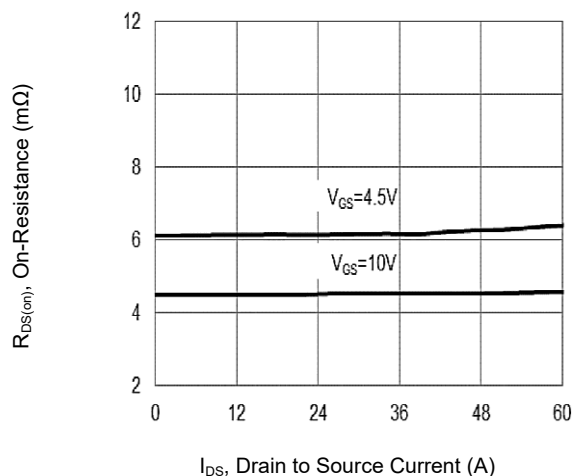
On-Region Characteristic



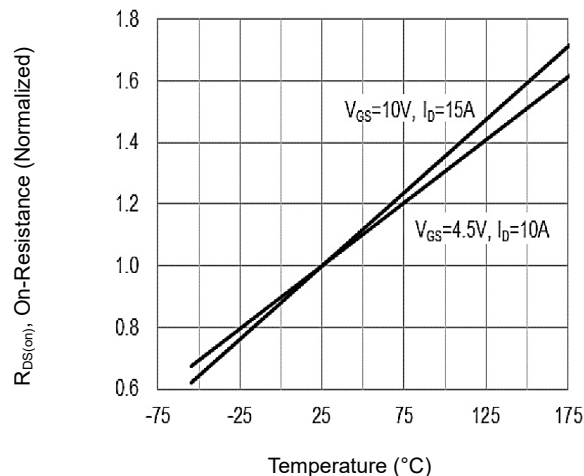
Transfer Characteristics



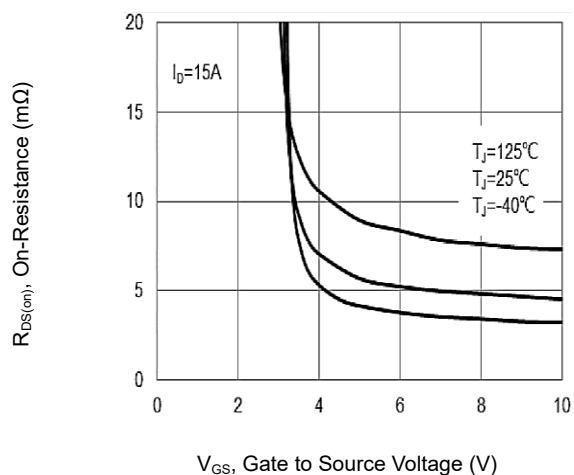
On-Resistance vs. Drain Current



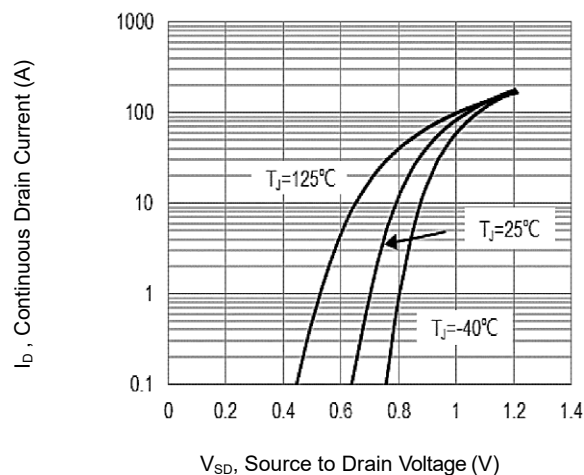
On-Resistance vs. Junction Temperature



On-Resistance Variation with VGS

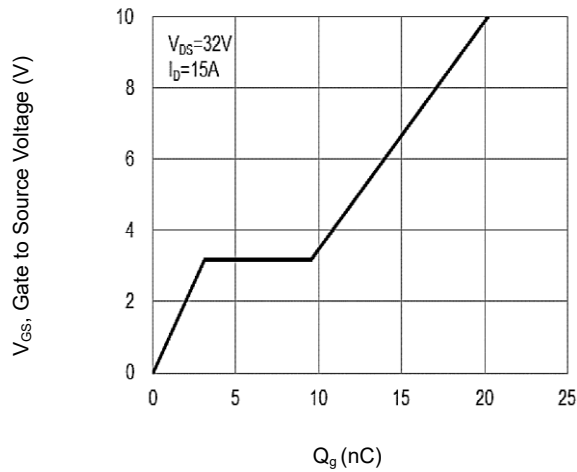


Source-Drain Diode Forward Voltage

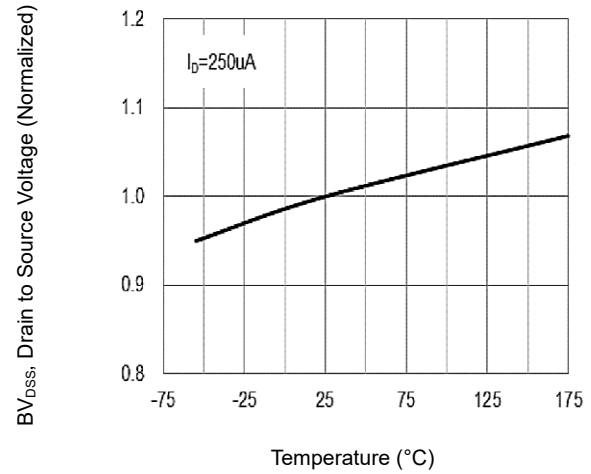


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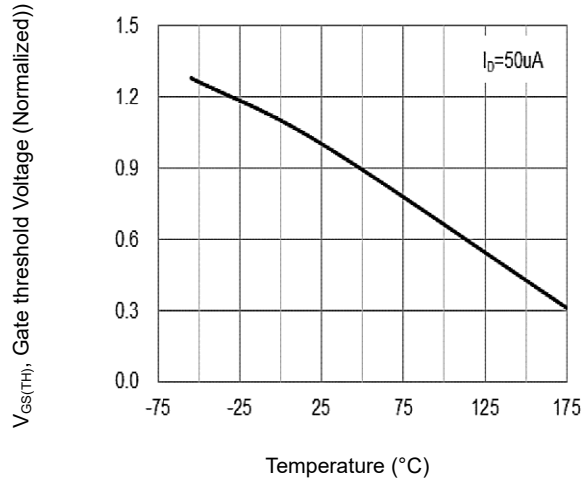
Gate-Charge Characteristics



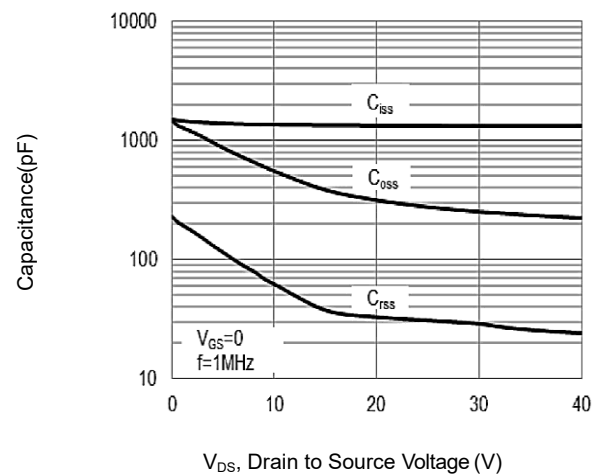
Breakdown Voltage Variation vs. Temperature



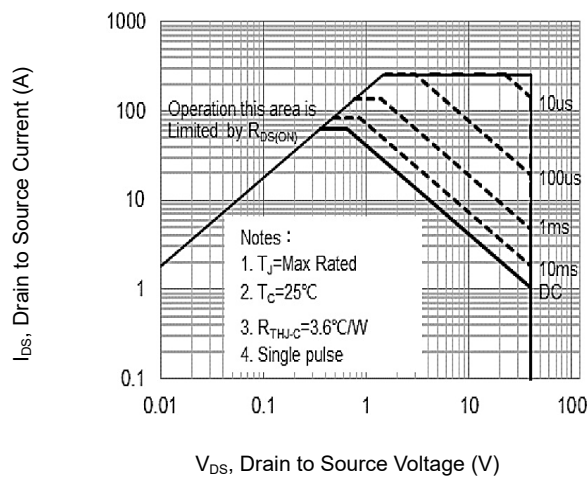
Threshold Voltage Variation with Temperature



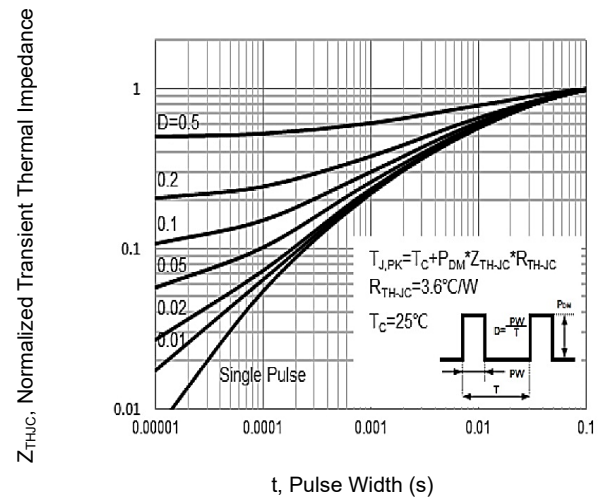
Capacitance vs. Drain-Source Voltage



Maximum Safe Operating Area



Normalized Transient Thermal Impedance



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