

Silicon Carbide MOSFET

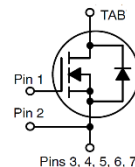
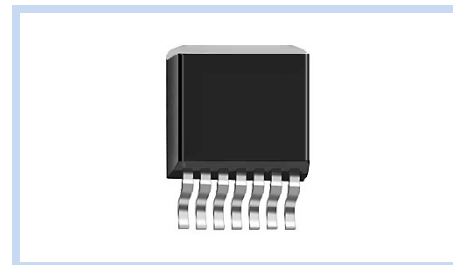
N-Channel 650V 48A TO-263-7

MFTC65N48T2637

MERITEK

FEATURE

- $R_{DS(ON)} < 80m\Omega$ at $V_{GS}=18V$, $I_D=15A$
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed switching
- Low Reverse Recovery Charge
- Applications: High Voltage DC-DC Converter, Switch Mode Power Supplier, Renewable Energy, Motor Drives



MECHANICAL DATA

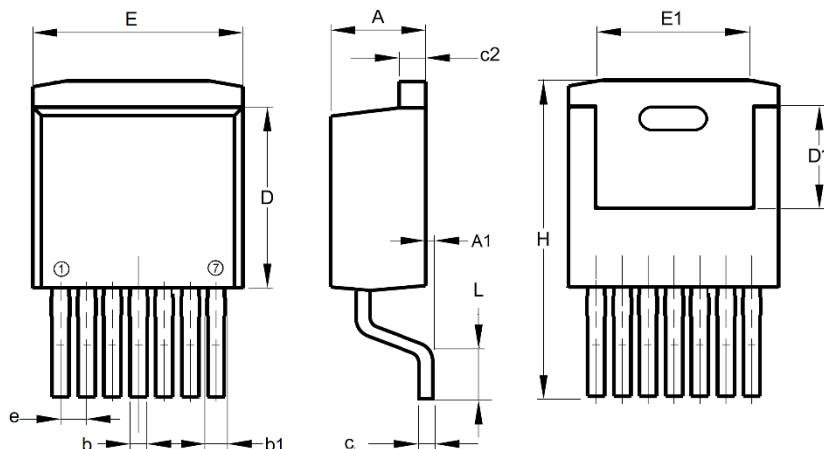
- Case: TO-263-7 Package
- Terminals: Solderable per MIL-STD-750, Method 2026

MAXIMUM RATINGS

Parameter		Symbol	Value	Unit
Drain-Source Voltage	$V_{GS}=0V$, $I_D=100\mu A$	V_{DS}	650	V
Gate-Source Voltage	Absolute Maximum Value	V_{GS}	-10/+25	V
	Recommended operational values		-4/+18	
Continuous Drain Current	$V_{GS}=18V$, $T_C=25^\circ C$	I_D	48	A
	$V_{GS}=18V$, $T_C=100^\circ C$		34	
Pulsed Drain Current	Pulse with t_p limited by T_{jmax}	$I_{D, pulse}$	85	A
Power Dissipation	$T_C=25^\circ C$	P_D	163	W
Thermal Resistance, Junction to Case		$R_{\theta JC}$	0.92	$^\circ C / W$
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 175	$^\circ C$

DIMENSIONS

DIMENSION	Min (mm)	Max (mm)
A	4.30	4.60
A1	0	0.25
b	0.50	0.70
b1	0.60	0.90
c	0.40	0.60
c2	1.20	1.40
D	8.88	9.28
D1	4.65	6.65
e	1.27 BSC	
E	10.08	10.28
E1	6.82	7.97
H	14.80	16.00
L	1.90	2.75



Note: Pin Layout: Tab: Drain; 1: Gate; 2: Driver Source;
3,4,5,6,7: Power Source

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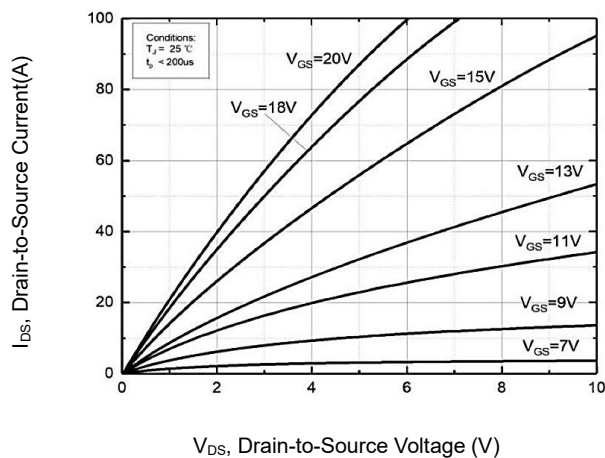
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ELECTRICAL CHARACTERISTICS

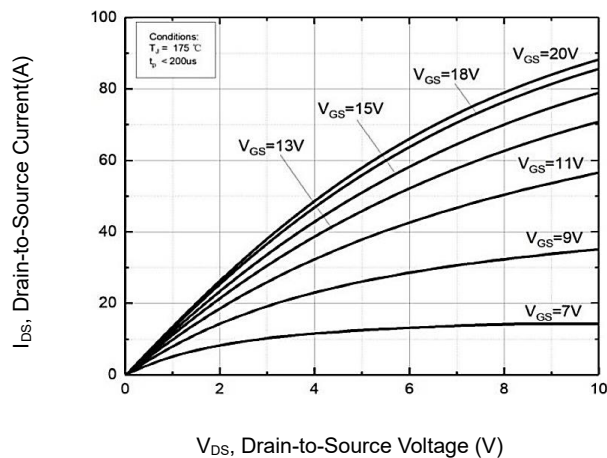
Off Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=100\mu A$	BV_{DSS}	650	--	--	V
Zero Gate Voltage Drain Current	$V_{DS}=650V, V_{GS}=0V$	I_{DSS}	--	1	50	μA
Gate-Body Leakage Current	$V_{GS}=18V, V_{DS}=0V$	I_{GSS}	--	--	250	nA
On Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Static Drain-Source On-Resistance	$V_{GS}=18V, I_D=15A$	$R_{DS(ON)}$	--	55	80	m Ω
	$V_{GS}=18V, I_D=15A, T_J=175^\circ C$		--	100	--	
Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=5mA$	$V_{GS(th)}$	--	2.7	--	V
	$V_{GS}=V_{DS}, I_D=5mA, T_J=175^\circ C$		--	1.8	--	
Transconductance	$V_{GS}=18V, I_D=15A$	g_{FS}	--	18	--	S
	$V_{GS}=18V, I_D=15A, T_J=175^\circ C$		--	11	--	
Dynamic Characteristics	Conditions	Symbol	Min	Typ.	Max	Unit
Total Gate Charge	$V_{DS}=400V, I_D=20A, V_{GS}=-4/+18V$	Q_g	--	66.2	--	nC
Gate-Source Charge		Q_{gs}	--	16.4	--	
Gate-Drain Charge		Q_{gd}	--	16.5	--	
Input Capacitance	$V_{DS}=600V, V_{GS}=0V, V_{AC}=25mV$ $f=1MHz$	C_{iss}	--	1410	--	pF
Output Capacitance		C_{oss}	--	119	--	
Reverse Transfer Capacitance		C_{rss}	--	4	--	
Internal Gate Resistance	$V_{AC}=25mV, f=1MHz$	$R_{DS(int)}$	--	1.8	--	Ω
Drain-Source Body Diode	Conditions	Symbol	Min	Typ.	Max	Unit
Drain-Source Diode Forward Voltage	$V_{GS}=-4V, I_{SD}=8.8A$	V_{SD}	--	3.7	--	V
	$V_{GS}=-4V, I_{SD}=8.8A, T_J=175^\circ C$		--	3.1	--	
Diode Forward Current - Continuous	$T_C=25^\circ C$	I_S	--	--	48	A
Diode Forward Current - Pulse with tp limited by Tjmax	$V_{GS}=-4V$	$I_{S,pulse}$	--	95	--	A

CHARACTERISTIC CURVES

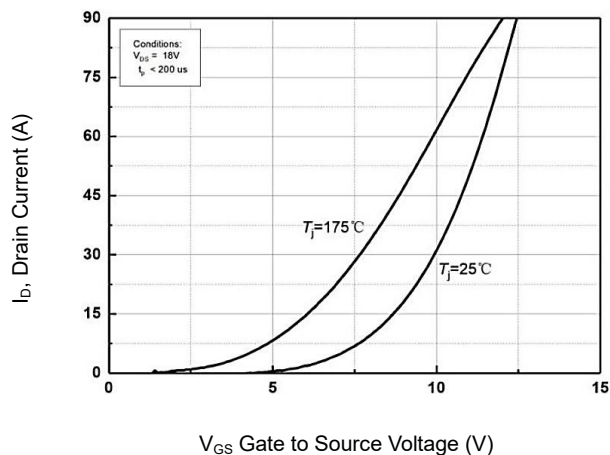
Output Characteristics



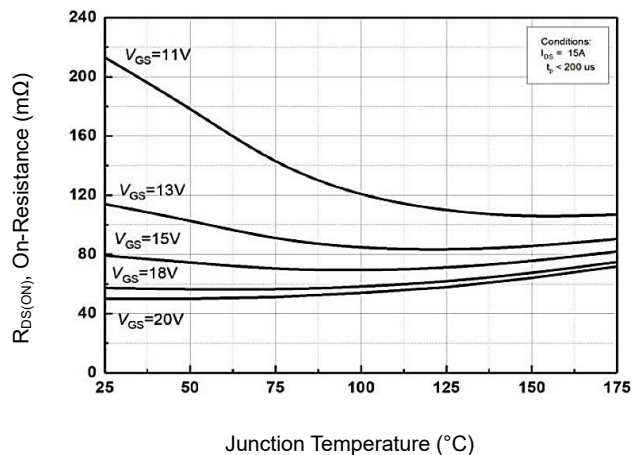
Output Characteristics



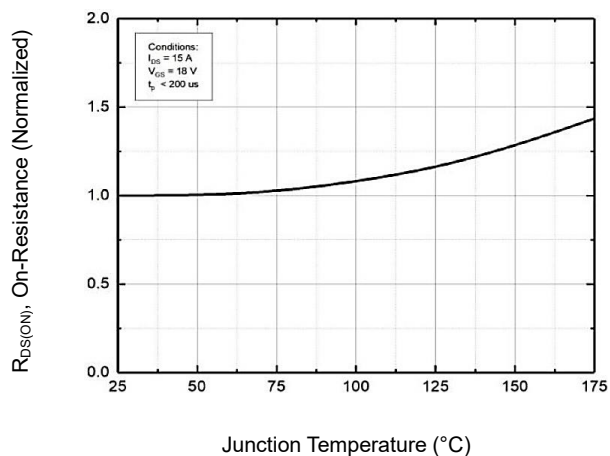
Transfer Characteristic



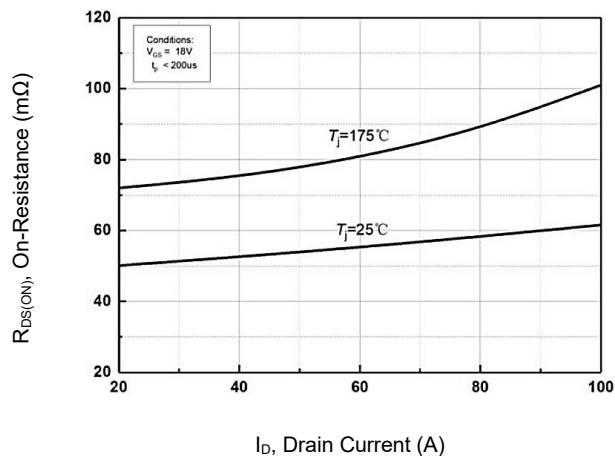
On-Resistance vs. Junction temperature for V_{GS}



Normalized On-Resistance vs. Junction temperature

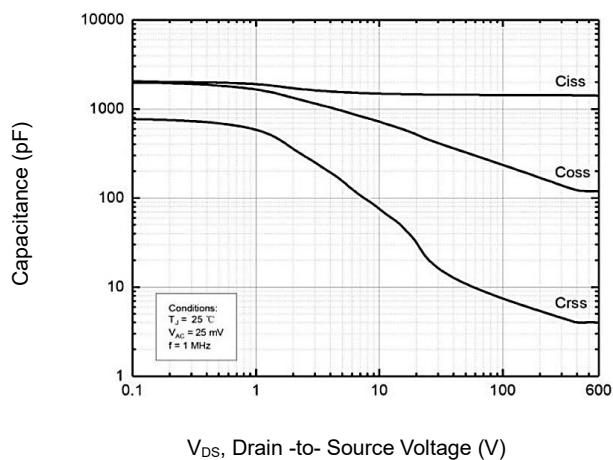


On-Resistance vs. Drain Current

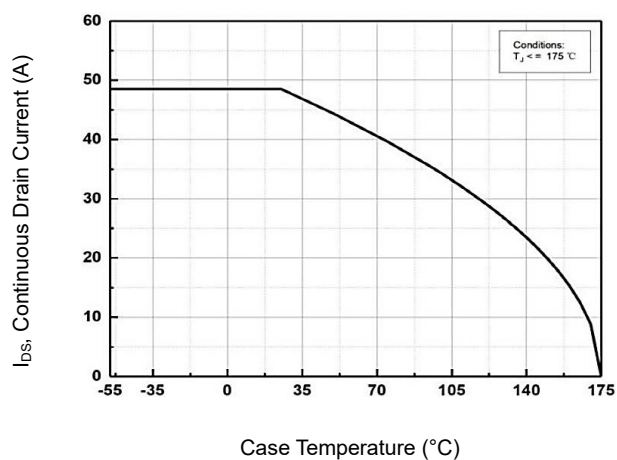


CHARACTERISTIC CURVES

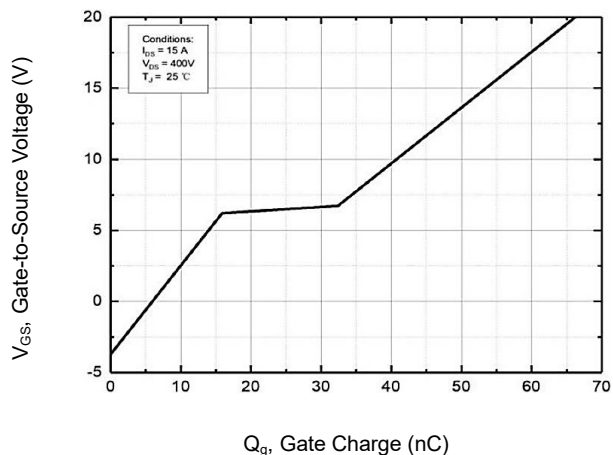
Capacitance vs. Drain-Source Voltage



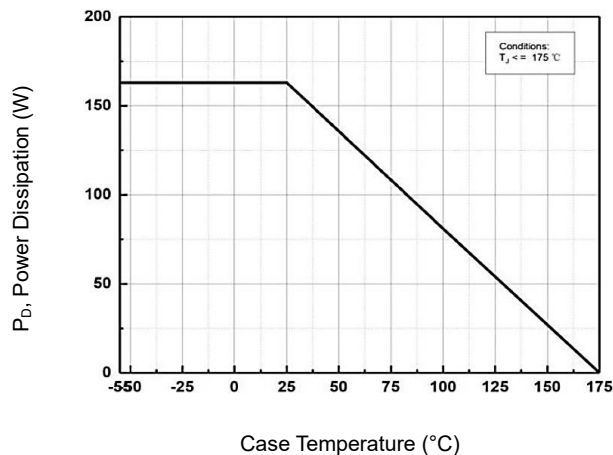
Continuous Drain Current vs. Case Temperature



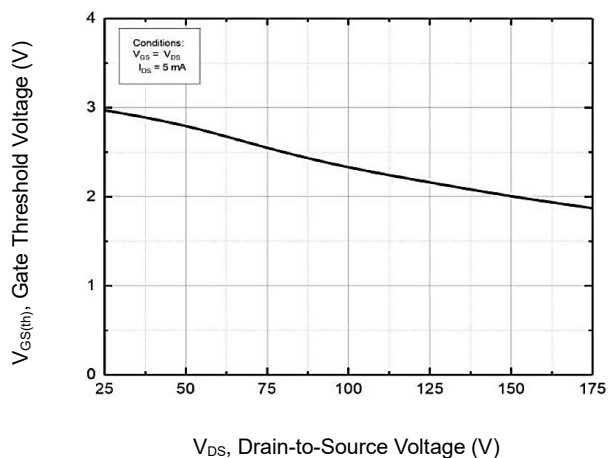
Gate-Charge Characteristics



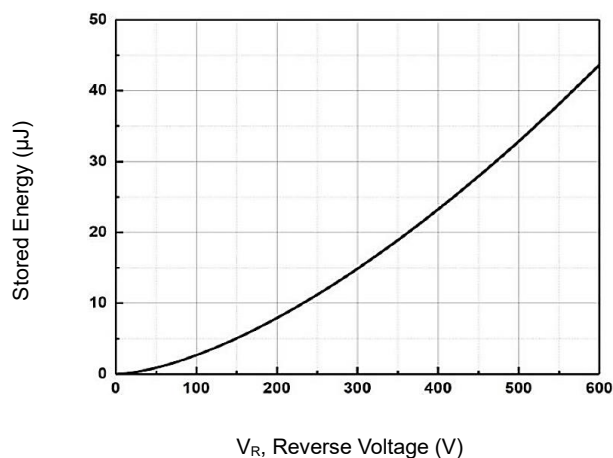
Maximum Power Dissipation Derating



Threshold Voltage vs. Junction temperature

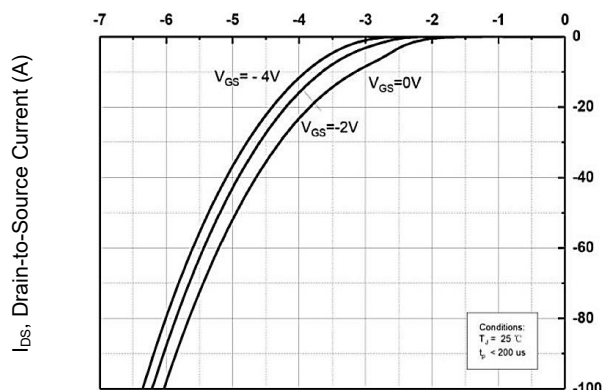


Output Capacitor Stored Energy



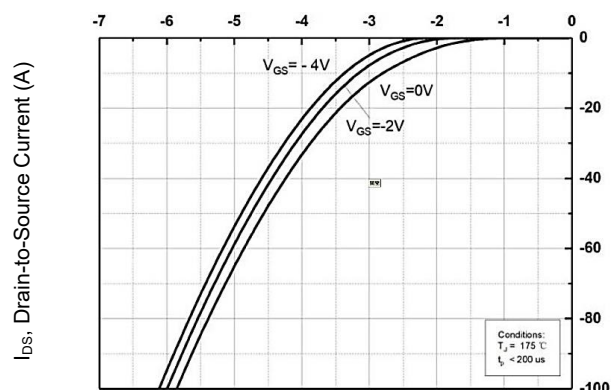
CHARACTERISTIC CURVES

Body Diode Characteristics



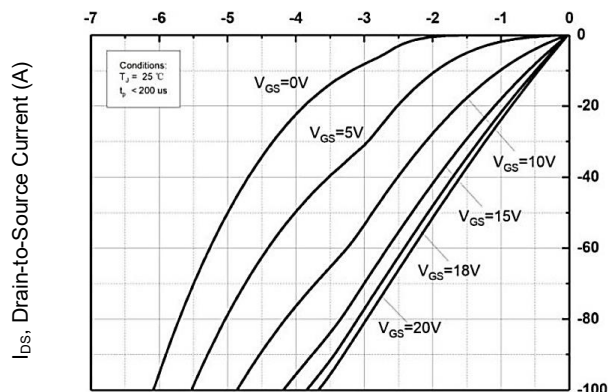
V_{DS} , Drain -to- Source Voltage (V)

Body Diode Characteristics



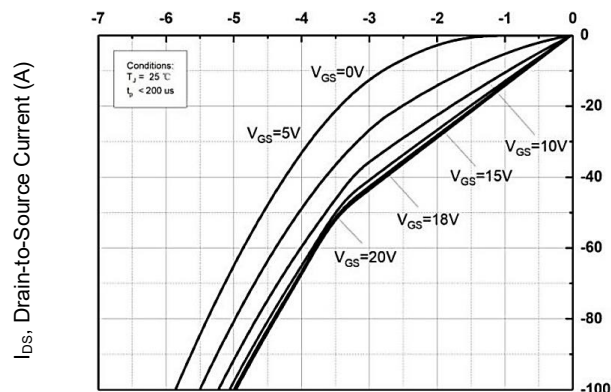
V_{DS} , Drain -to- Source Voltage (V)

3rd Quadrant Characteristics



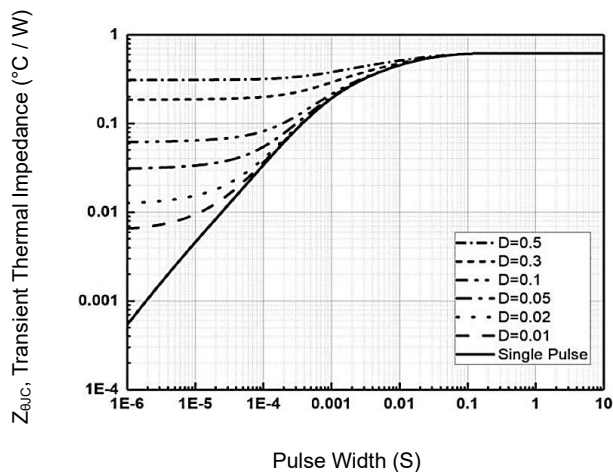
V_{DS} , Drain -to- Source Voltage (V)

3rd Quadrant Characteristics



V_{DS} , Drain -to- Source Voltage (V)

Transient Thermal Impedance



Safe Operating Area

