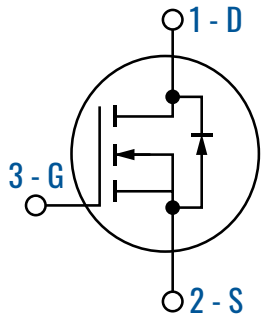
KEY FEATURES

- I_D 23A
- $R_{DS(on)}$ 260mΩ
- FAST RECOVERY DIODE
- AVALANCHE RATED
- TO-254 HERMETIC PACKAGE
- BACKSIDE ISOLATION
- JANTX, JANTXV SCREENING AVAILABLE



V_{DS} = 500V
I_D @ 25°C = 23A
$R_{DS(on)}$ = 260mΩ

ORDERING GUIDE

Part Number SMF178

Description 500V N-Channel Power MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise specified)

PARAMETER	SYMBOL	VALUE	TEST CONDITIONS
Drain-Source Voltage	V_{DSmax}	500V	V_{GS} = 0V, I_D = 250µA
Gate-Source Voltage (dynamic)	V_{GSM}	±30V	Transient
Gate-Source Voltage	V_{GSS}	±20V	Continuous
Drain Current, continous	I_{D25}	23A	T_C = 25°C
Drain Current, pulsed	$I_{D(PULSE)}$	46A	Pulse width T_p limited by T_{Jmax}
Power Dissipation	P_D	280W	T_C = 25°C
Junction Temperature Range, Operating Junction Temperature Range, Storage	T_J T_{STG}	-55°C to 150°C	

ELECTRICAL SPECIFICATIONS (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250µA	$V_{(BR)DSS}$	500			V
Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250µA, T_J = 25°C	$V_{GS(th)}$	3		5	V
Off -State Drain Current	V_{DS} = 500V, V_{GS} = 0V, T_J = 25°C	I_{DSS}			50	µA
	V_{DS} = 400V, V_{GS} = 0V, T_J = 125°C				2	mA
Gate-Source Leakage Current	V_{GS} = ±30V, V_{DS} = 0V	I_{GSS}			±100	nA
Drain-Source On-state Resistance	V_{GS} = 10V, I_D = 13.8A, T_J = 25°C	$R_{DS(on)}$		240	260	mΩ
Transconductance	V_{DS} = >50V, I_D = 14A, T_J = 25°C	G_{fs}	11			S
Input Capacitance Output Capacitance Reverse Transfer Capacitance	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz	C_{iss} C_{oss} C_{rss}		4300 1000 250		pF
Total Gate Charge Gate to Source Charge Gate to Drain Charge	V_{GS} = 10V, V_{DS} = 400V, I_{DS} = 23A	$Q_{g(on)}$ Q_{gs} Q_{gd}			150 25 42	nC
Turn On Delay Time Rx Time Turn Off Delay Time Fail Time	V_{DD} = 250V, R_G = 4.3Ω	$t_{d(on)}$ t_r $t_{d(off)}$ t_f		18 55 45 29		ns
Thermal Resistance		R_{thJC}			0.445	°C/W

BODY DIODE CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Parameter		Symbol	Min.	Typ.	Max.	Unit
Body Diode Forward Voltage	I_S = 15A, V_{GS} = 0V	V_{SD}			1.5	V
Body Diode Reverse Recovery Time	I_D = 23A, di/dt ≤ 100A/µs	T_{rr}			250	ns
Source to Drain Diode Current, cont.		I_S			19	A

TYPICAL PERFORMANCE

Fig. 1 Maximum Power Dissipation vs.Case Temperature

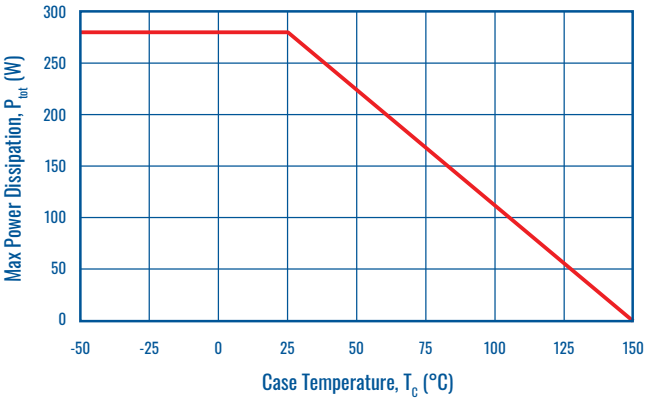


Figure 2. MOSFET Junction to case Transient Thermal Impedance, Zth J_C (°C/W)

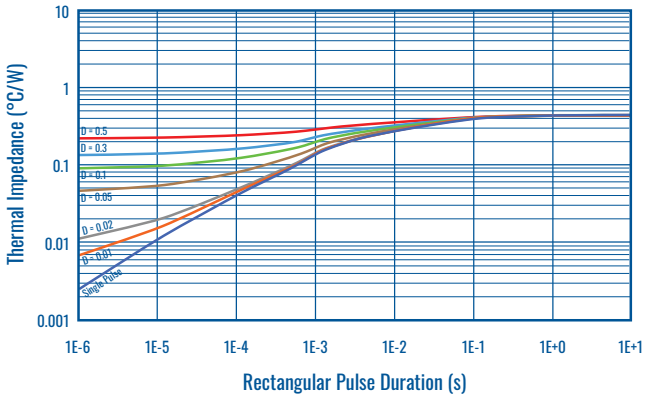
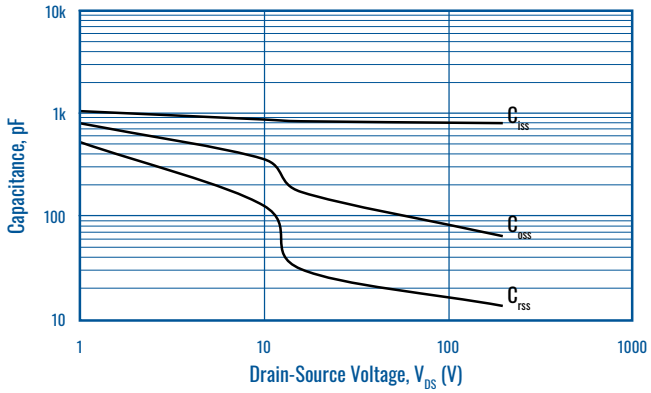
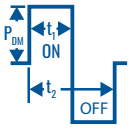


Figure 3. Capacitance vs Drain-Source Voltage

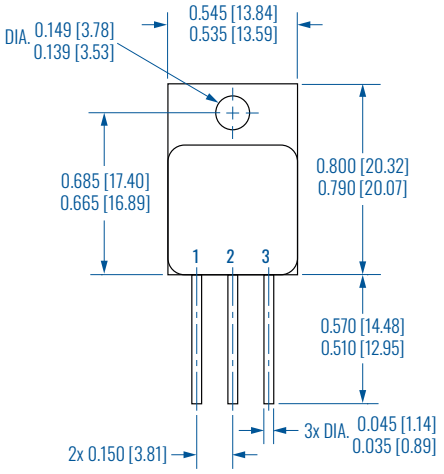


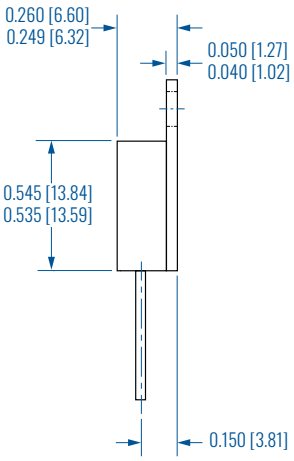
$T_{J(Pk)} = (P_{DM}\ P \times Z_{thJC}) + Z_C$



Duty Factor D = t_1/t_2

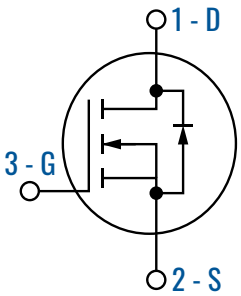
OUTLINE DIMENSION





All dimensions in inches (mm) minimum maximum

SCHEMATIC



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