P-Channel 60-V (D-S) MOSFET

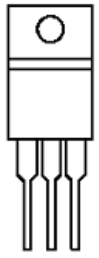
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

Typical Applications:
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
-60	70 @ V_{GS} = -10V	54[a]
	80 @ V_{GS} = -4.5V	

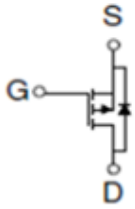
Pb-free
RoHS COMPLIANT
HALOGEN FREE

TO-220CFM



G D S

Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Units**
Drain-Source Voltage		V_{DS}	-60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current [a]	T_C=25°C	I_D	-54	A
Pulsed Drain Current [b]		I_{DM}	-200	
Continuous Source Current (Diode Conduction) [a]	T_C=25°C	I_S	-54	A
Power Dissipation [a]	T_C=25°C	P_D	300	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	1	

Notes

a. Package Limited

b. Pulse width limited by maximum junction temperature

Electrical Characteristics

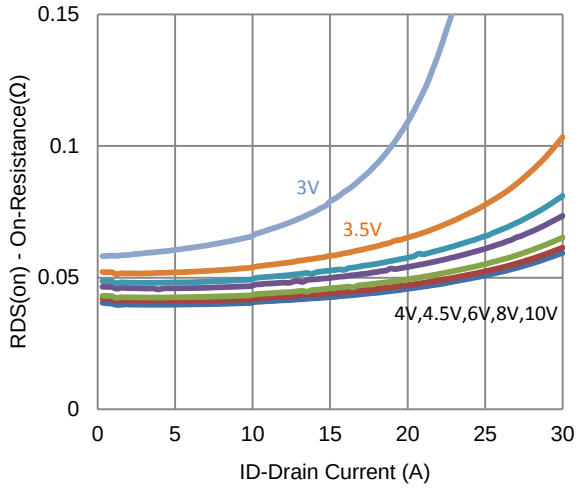
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 uA	-1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -48 V, V_{GS} = 0 V			-1	uA
		V_{DS} = -48 V, V_{GS} = 0 V, T_J = 55°C			-25	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = -5 V, V_{GS} = -10 V	-80			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = -10 V, I_D = -20 A			70	mΩ
		V_{GS} = -4.5 V, I_D = -18 A			80	
Forward Transconductance [a]	g_{fs}	V_{DS} = -15 V, I_D = -20 A		29		S
Diode Forward Voltage [a]	V_{SD}	I_S = -55 A, V_{GS} = 0 V		-1.2		V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = -30 V, V_{GS} = -4.5 V, I_D = -20 A		29		nC
Gate-Source Charge	Q_{gs}			9.1		
Gate-Drain Charge	Q_{gd}			13		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = -30 V, R_L = 1.5 Ω, I_D = -20 A, V_{GEN} = -10 V, R_{GEN} = 6 Ω		8		ns
Rise Time	t_r			7		
Turn-Off Delay Time	$t_{d(off)}$			83		
Fall Time	t_f			32		
Input Capacitance	C_{iss}	V_{DS} = -15 V, V_{GS} = 0 V, f = 1 Mhz		1184		pF
Output Capacitance	C_{oss}			181		
Reverse Transfer Capacitance	C_{rss}			157		

Notes

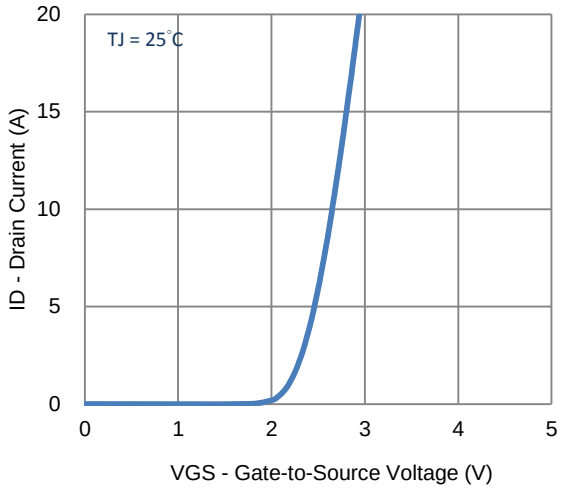
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

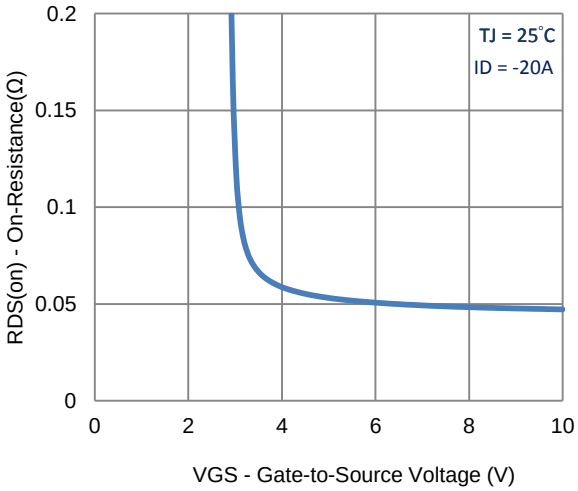
Typical Electrical Characteristics



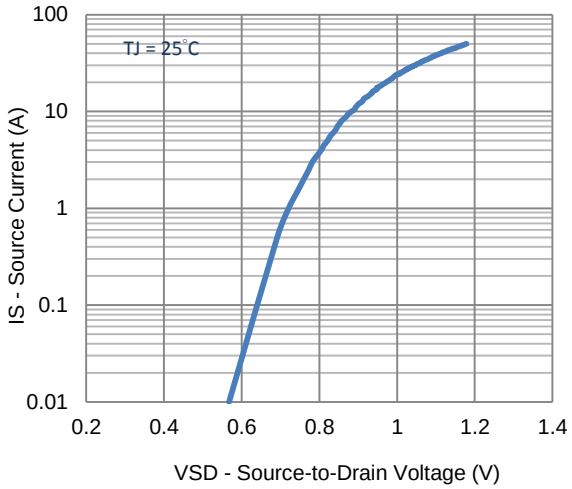
1. On-Resistance vs. Drain Current



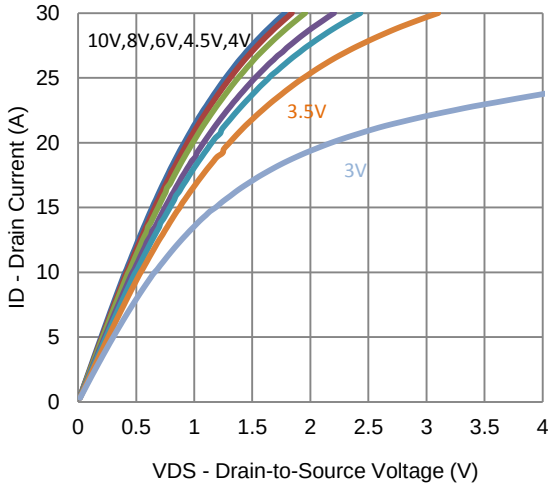
2. Transfer Characteristics



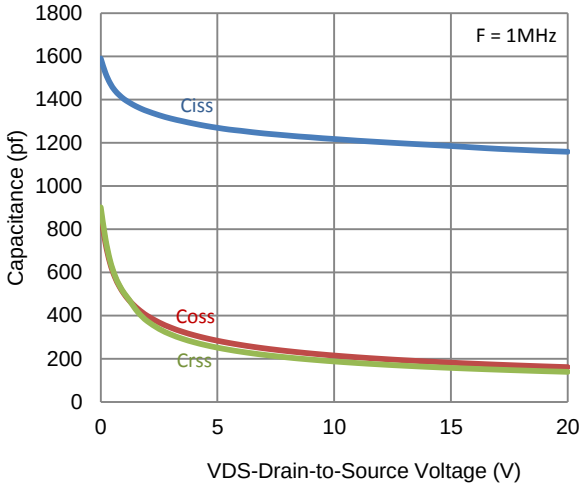
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

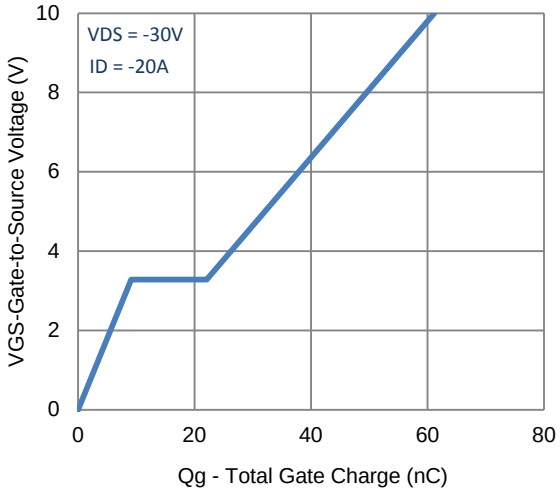


5. Output Characteristics

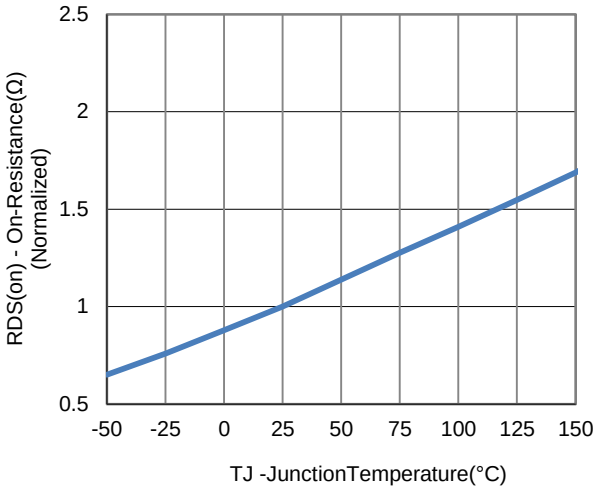


6. Capacitance

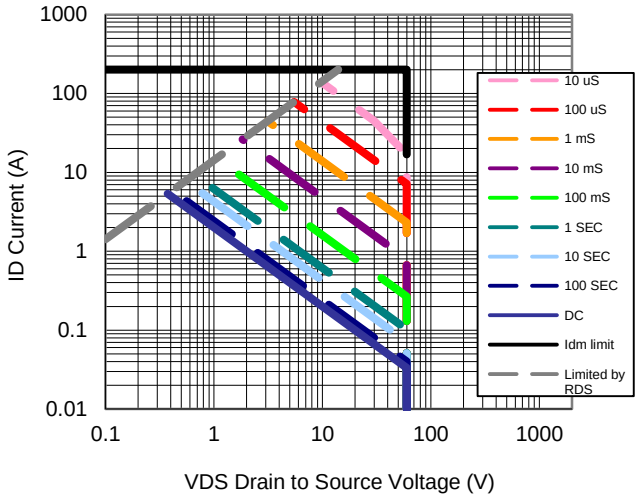
Typical Electrical Characteristics



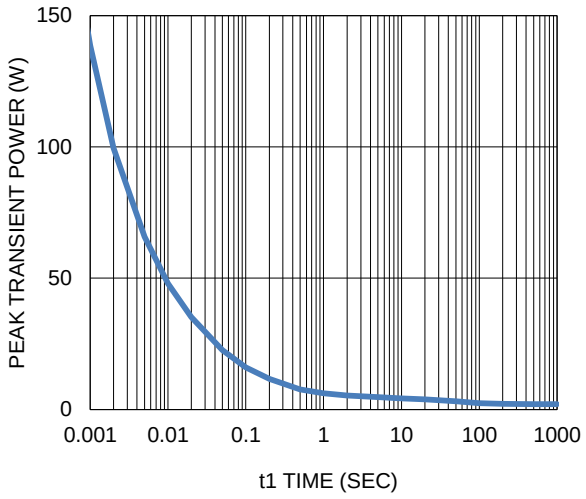
7. Gate Charge



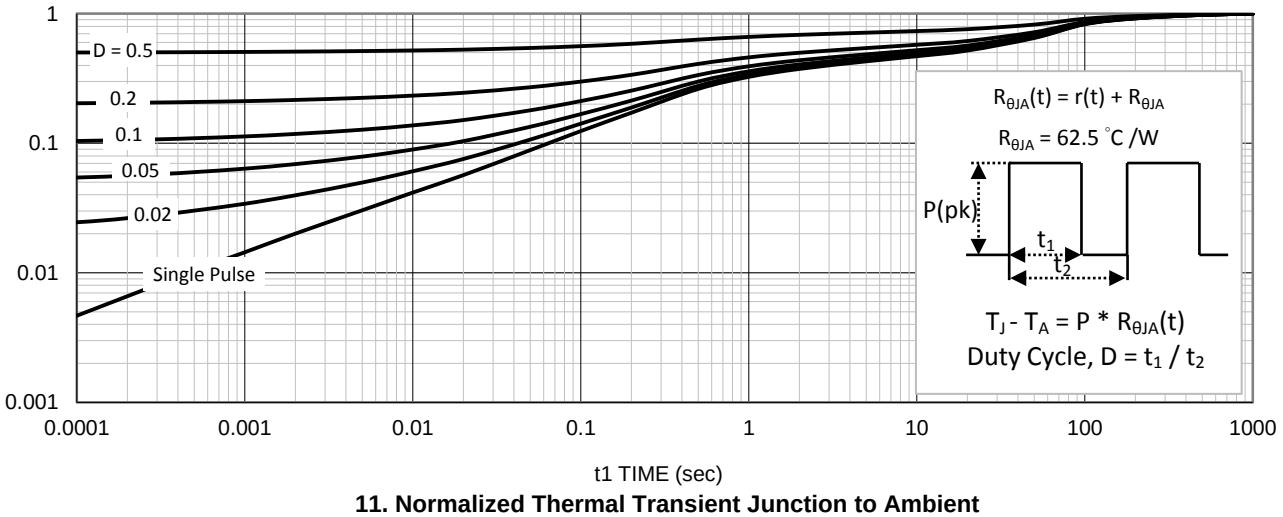
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



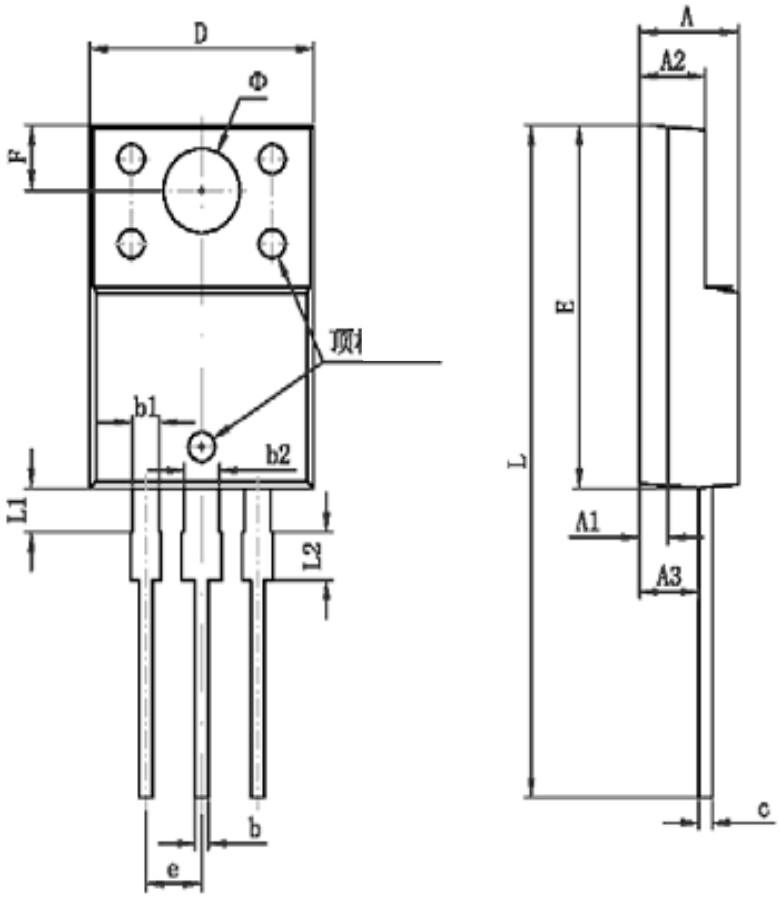
10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information

TO-220CFM



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.300	4.700	0.169	0.185
A1	1.300 REF		0.051 REF	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP		0.100 TYP	
F	2.700 REF		0.106 REF	
Φ	3.500 REF		0.138 REF	
h	0.000	0.300	0.000	0.012
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083