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

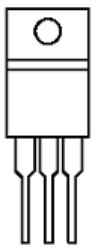
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

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

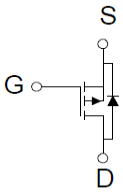
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
-60	20 @ V_{GS} = -10V	-45
	28 @ V_{GS} = -4.5V	-38

Pb-free
RoHS COMPLIANT
HALOGEN FREE

TO-220CFM



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	-45	A
Pulsed Drain Current [b]		I_{DM}	-180	
Continuous Source Current (Diode Conduction) [a]	T_C=25°C	I_S	-45	A
Power Dissipation [a]	T_C=25°C	P_D	60	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 [c]	$R_{\theta JA}$	62.5	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	0.29	

Notes
a. Package Limited
b. Pulse width limited by maximum junction temperature
c. Surface Mounted on 1” x 1” FR4 Board.

Electrical Characteristics

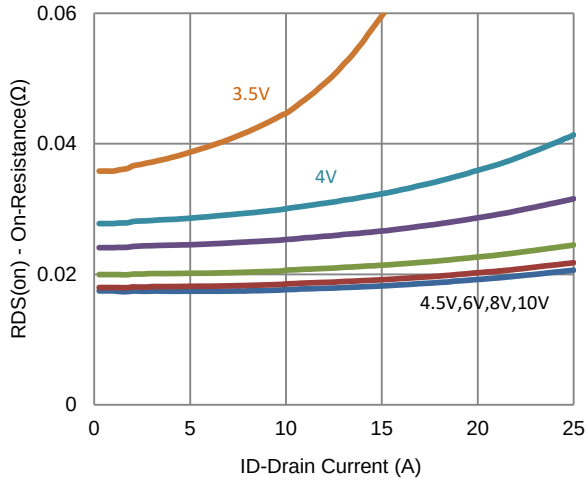
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 uA	-1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -48 V, V_{GS} = 0 V			-1	uA
		V_{DS} = -48 V, V_{GS} = 0 V, T_J = 55°C			-10	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = -5 V, V_{GS} = -10 V	-110			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = -10 V, I_D = -20 A			20	mΩ
		V_{GS} = -4.5 V, I_D = -16 A			28	
Forward Transconductance [a]	g_{fs}	V_{DS} = -15 V, I_D = -20 A		10		S
Diode Forward Voltage [a]	V_{SD}	I_S = -20 A, V_{GS} = 0 V		-0.9		V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = -30 V, V_{GS} = -4.5 V, I_D = -20 A		22		nC
Gate-Source Charge	Q_{gs}			10		
Gate-Drain Charge	Q_{gd}			9.3		
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		9		ns
Rise Time	t_r			9		
Turn-Off Delay Time	$t_{d(off)}$			85		
Fall Time	t_f			27		
Input Capacitance	C_{iss}	V_{DS} = -15 V, V_{GS} = 0 V, f = 1 Mhz		4464		pF
Output Capacitance	C_{oss}			216		
Reverse Transfer Capacitance	C_{rss}			163		

Notes

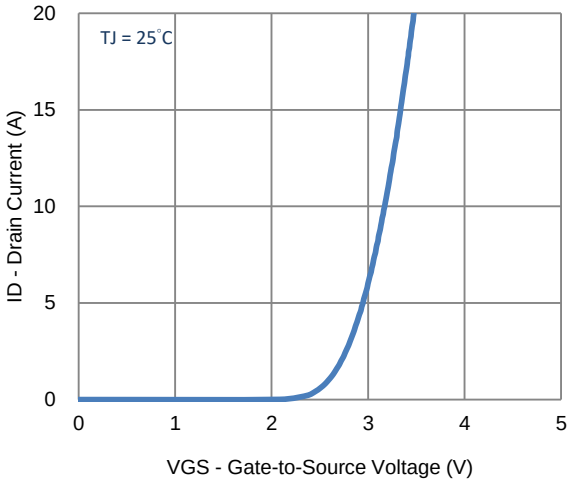
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

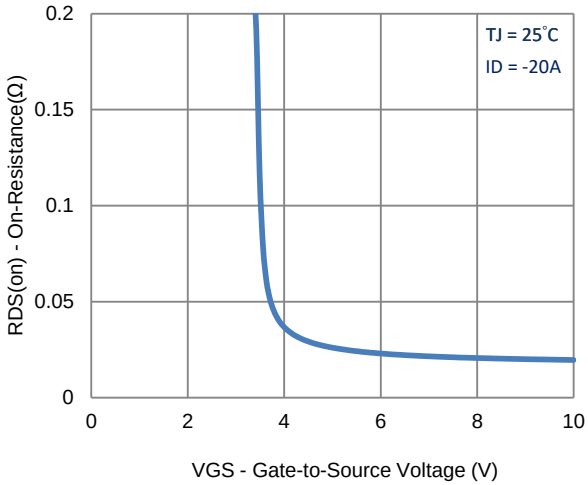
Typical Electrical Characteristics



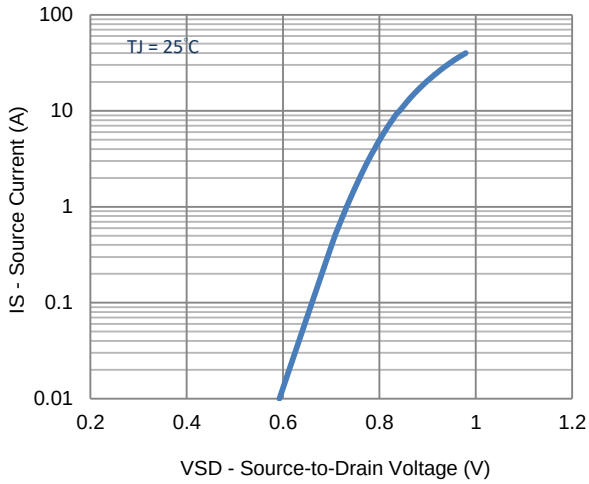
1. On-Resistance vs. Drain Current



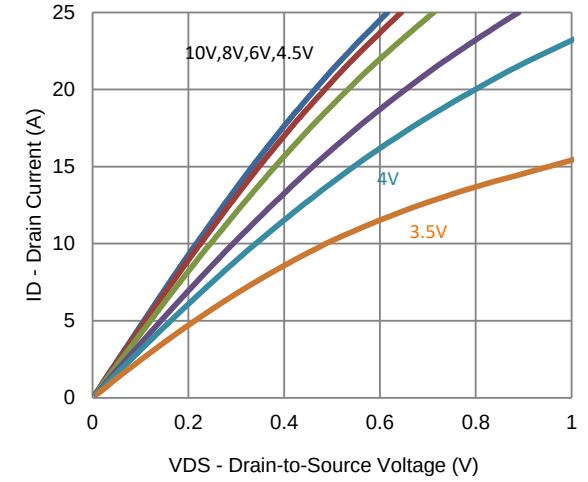
2. Transfer Characteristics



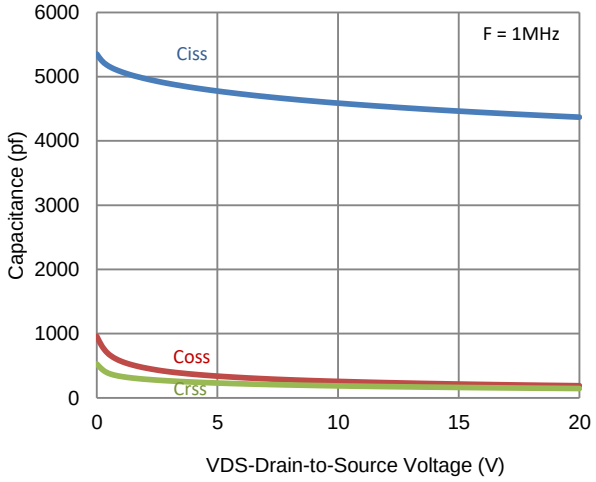
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

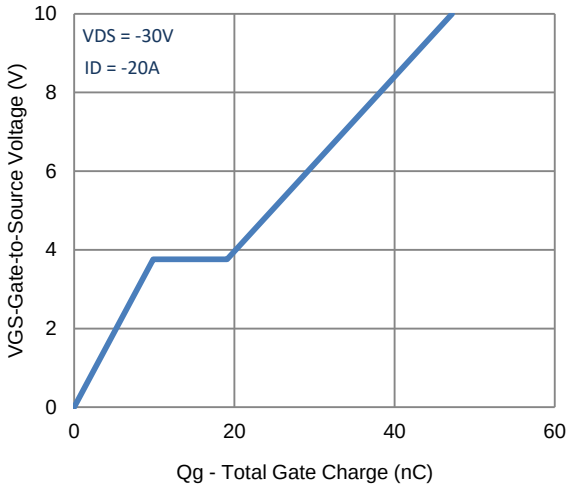


5. Output Characteristics

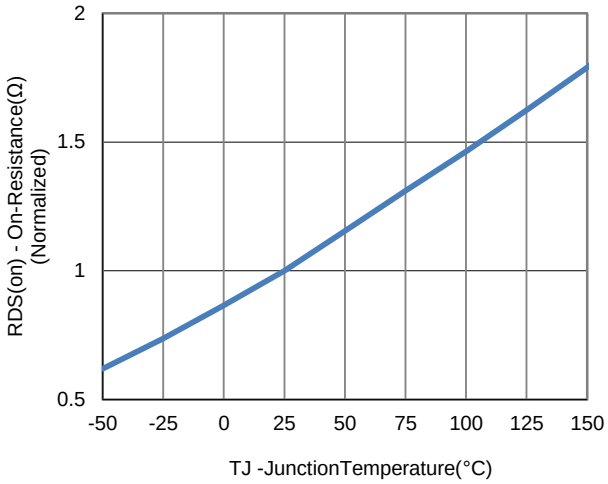


6. Capacitance

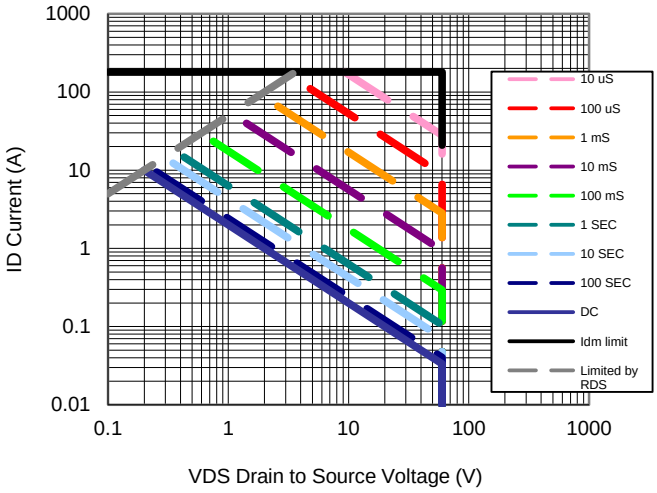
Typical Electrical Characteristics



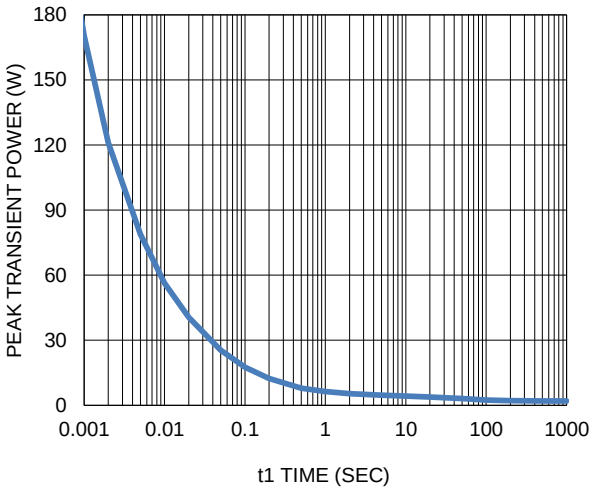
7. Gate Charge



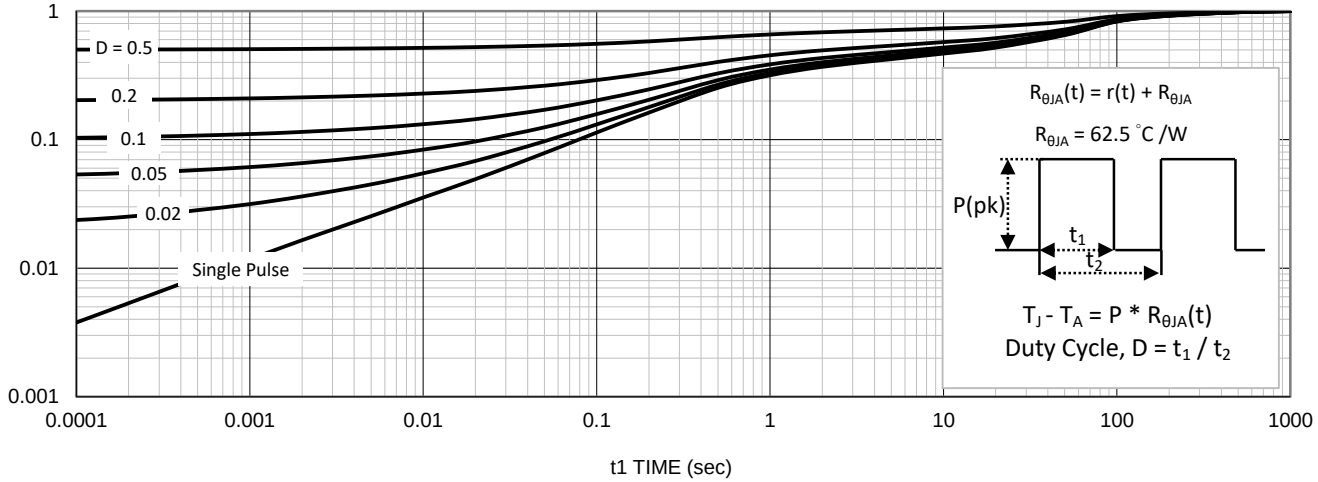
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

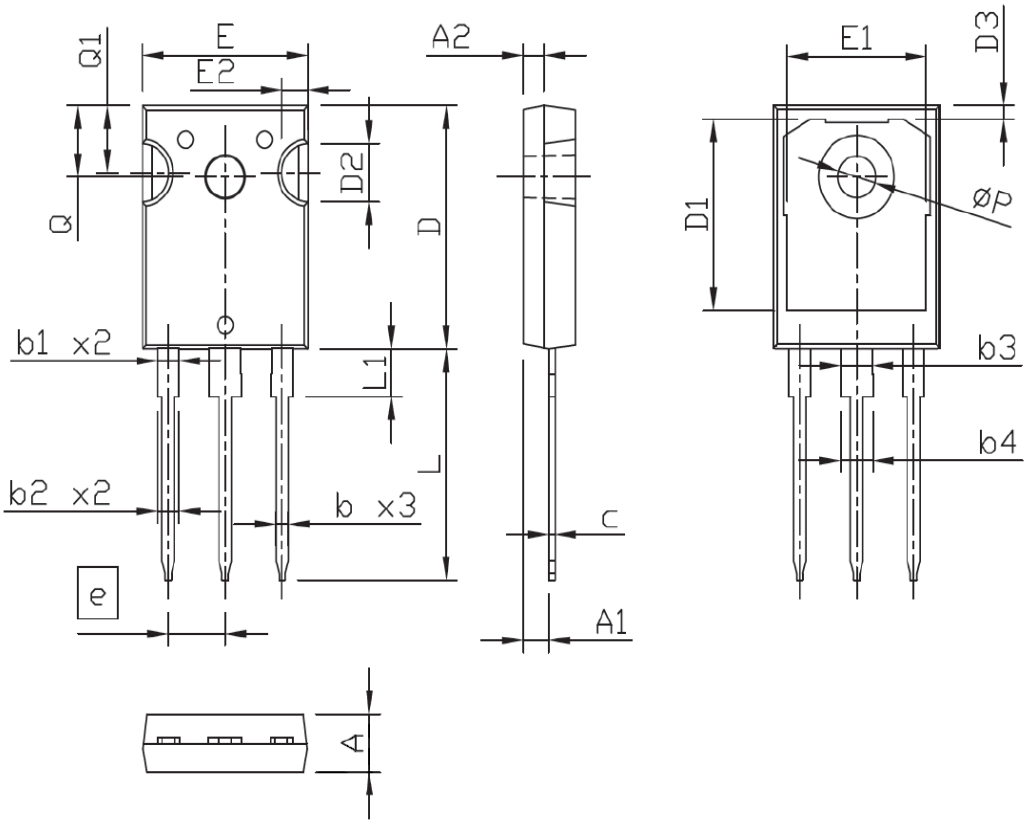


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	2.32	2.42	2.52
A2	1.90	2.00	2.10
b	1.17	1.22	1.27
b1	1.97	2.02	2.07
b2	2.00	2.10	2.20
b3	2.97	3.02	3.07
b4	3.00	3.10	3.20
c	0.59	0.62	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	5.00 TYP		
D3	1.05	1.20	1.35
e	5.44 BSC		
E	15.70	15.80	15.90
E1	13.06	13.26	13.46
E2	2.50 TYP		
L	19.72	19.92	20.12
L1	---	---	4.30
Q	6.15 BSC		
Q1	5.60	5.80	6.00
øP	3.55	3.60	3.65