N-Channel 40-V (D-S) MOSFET

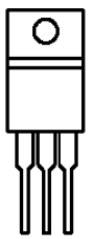
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

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)
40	5 @ V_{GS} = 10V	90[a]
	7.5 @ V_{GS} = 5.5V	

Pb-free
RoHS COMPLIANT
HALOGEN FREE

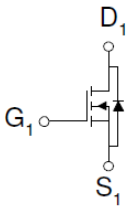
TO-220AB



DRAIN connected to TAB

G D S

Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Units**
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current [a]	T_C=25°C	I_D	90	A
Pulsed Drain Current [b]		I_{DM}	360	
Continuous Source Current (Diode Conduction) [a]		I_S	90	A
Power Dissipation [a]	T_C=25°C	P_D	300	W
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

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

Notes

a. Surface Mounted on 1” x 1” FR4 Board.

b. Pulse width limited by maximum junction temperature

Electrical Characteristics

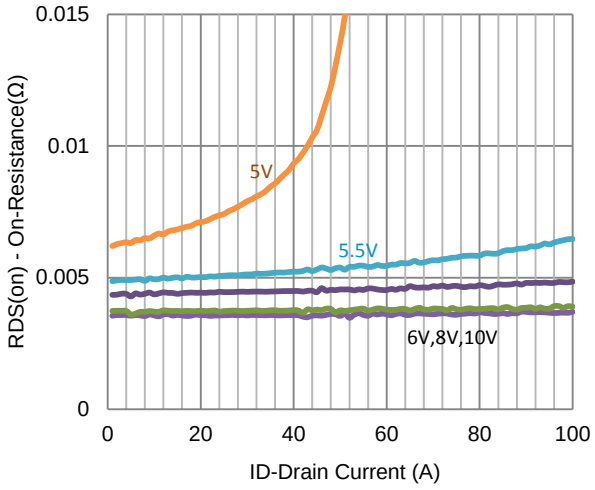
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32 V, V_{GS} = 0 V			1	uA
		V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55°C			25	
On-State Drain Current	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	120			A
Drain-Source On-Resistance	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 45 A			5	mΩ
		V_{GS} = 5.5 V, I_D = 40 A			7.5	
Forward Transconductance	g_{fs}	V_{DS} = 15 V, I_D = 20 A		30		S
Diode Forward Voltage	V_{SD}	I_S = 55 A, V_{GS} = 0 V		0.89		V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 5.5 V, I_D = 20 A		69		nC
Gate-Source Charge	Q_{gs}			31		
Gate-Drain Charge	Q_{gd}			31		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 20 V, R_L = 1 Ω, I_D = 20 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		37		ns
Rise Time	t_r			45		
Turn-Off Delay Time	$t_{d(off)}$			112		
Fall Time	t_f			39		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		9569		pF
Output Capacitance	C_{oss}			768		
Reverse Transfer Capacitance	C_{rss}			548		

Notes

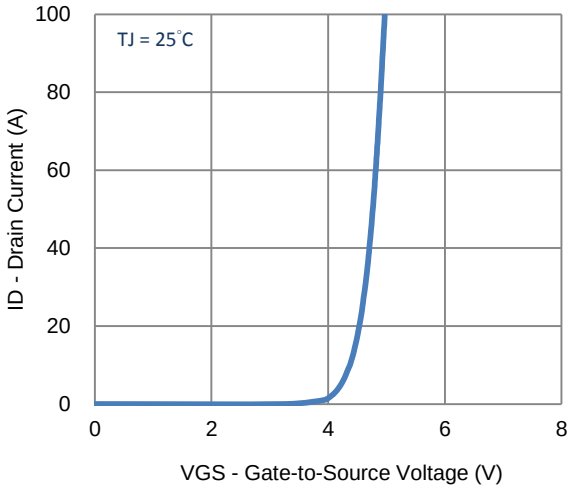
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

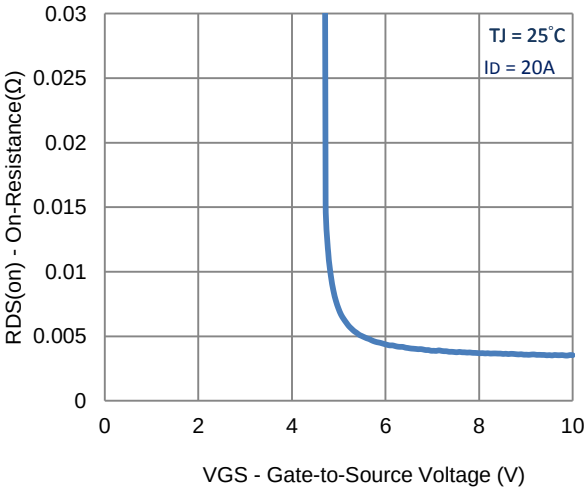
Typical Electrical Characteristics



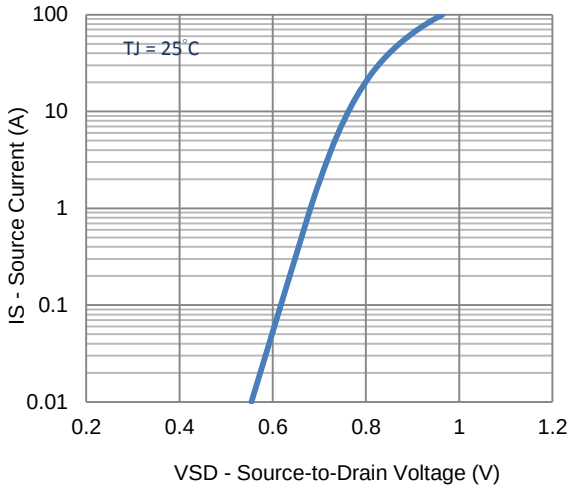
1. On-Resistance vs. Drain Current



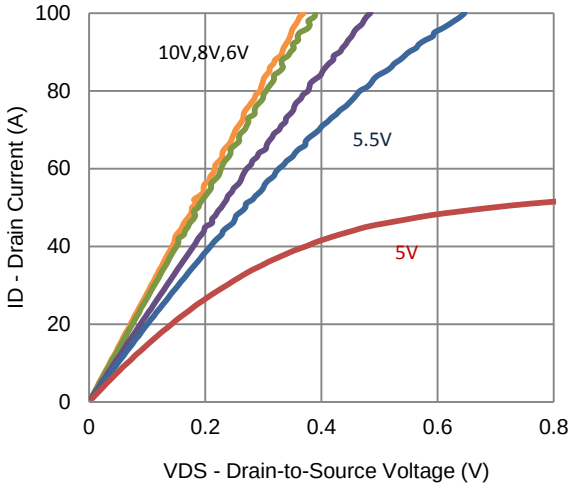
2. Transfer Characteristics



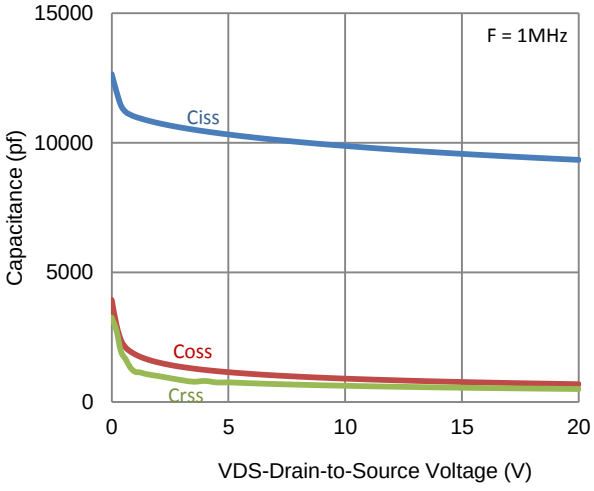
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

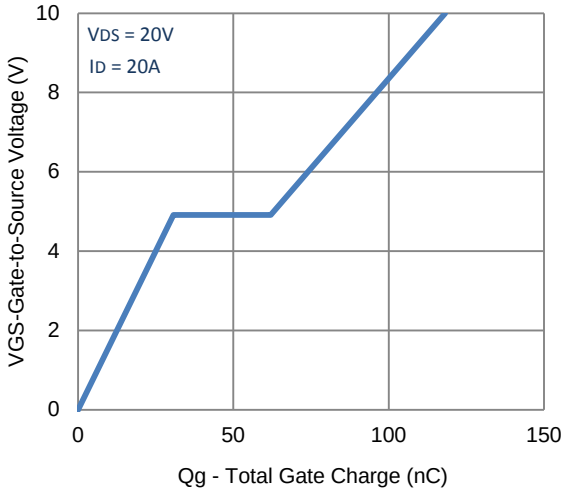


5. Output Characteristics

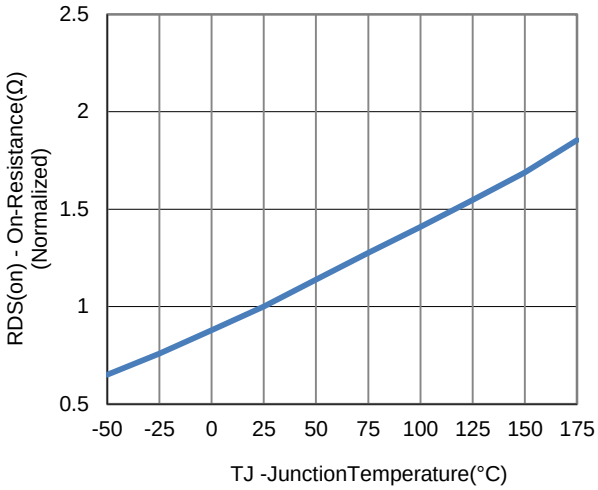


6. Capacitance

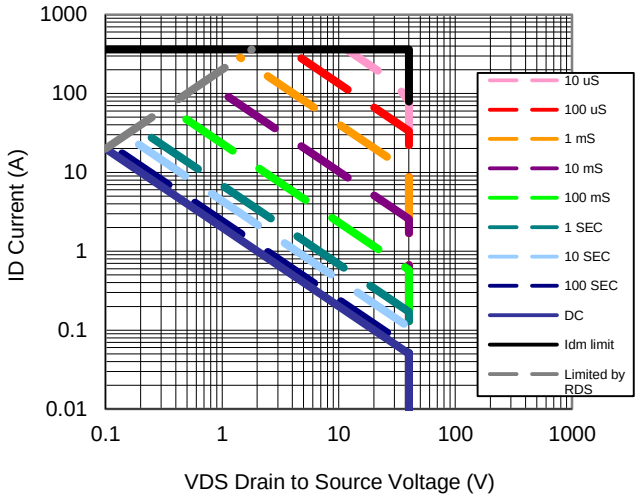
Typical Electrical Characteristics



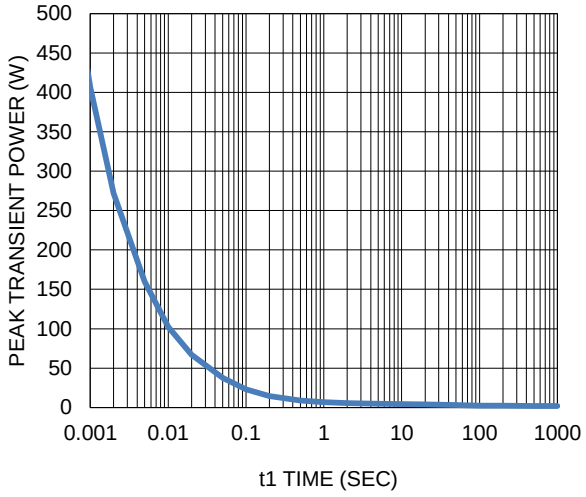
7. Gate Charge



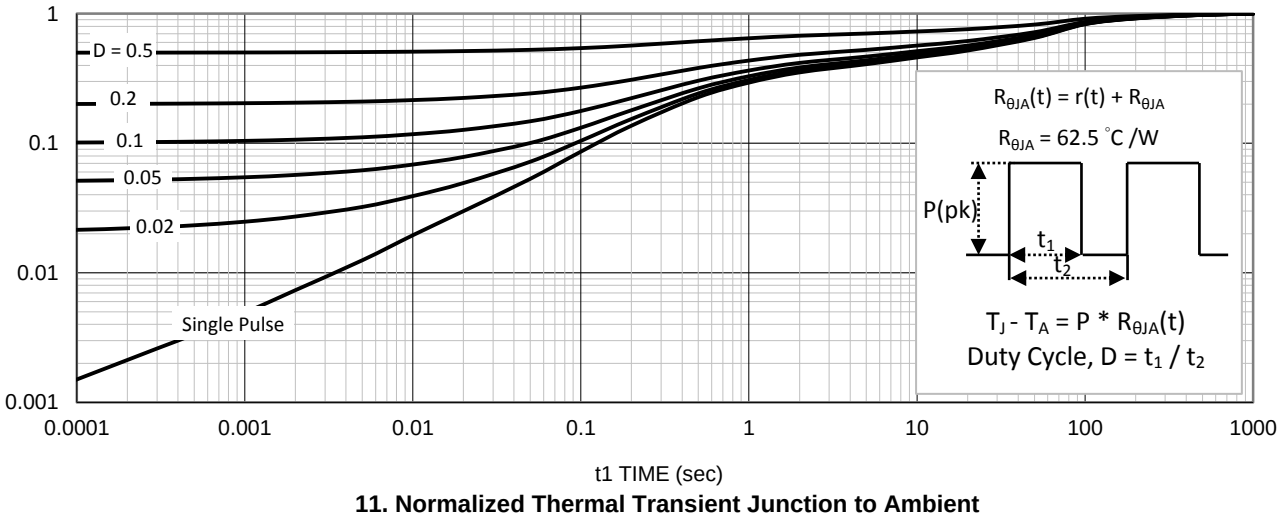
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information