N-Channel 650-V (D-S) MOSFET

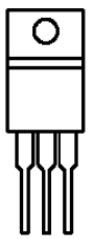
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

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)
650	800 @ V_{GS} = 10V	12[a]
	850 @ V_{GS} = 6V	

Pb-free
RoHS COMPLIANT
HALOGEN FREE

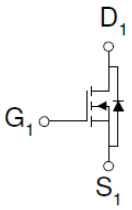
TO-220AB



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}	650	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current [a]	T_C=25°C	I_D	12	A
Pulsed Drain Current [b]		I_{DM}	50	
Continuous Source Current (Diode Conduction) [a]		I_S	40	A
Power Dissipation	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 [a]	$R_{\theta JA}$	62.5	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	1	

Notes

a. Calculated continuous current based on maximum allowable junction temperature.

b. Pulse width limited by maximum junction temperature

Electrical Characteristics

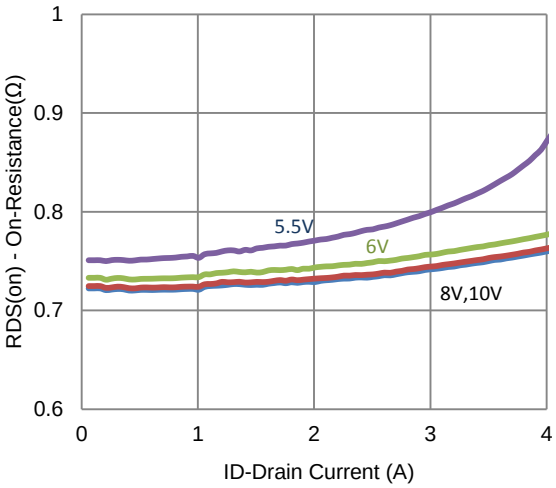
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 520 V, V_{GS} = 0 V			1	uA
		V_{DS} = 520 V, 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	30			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 2 A			800	mΩ
		V_{GS} = 6 V, I_D = 1.6 A			850	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 2 A		58		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} = 100 V, V_{GS} = 6 V, I_D = 2 A		23		nC
Gate-Source Charge	Q_{gs}			11		
Gate-Drain Charge	Q_{gd}			11		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 100 V, R_L = 50 Ω, I_D = 2 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		24		ns
Rise Time	t_r			10		
Turn-Off Delay Time	$t_{d(off)}$			60		
Fall Time	t_f			11		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz		2691		pF
Output Capacitance	C_{oss}			165		
Reverse Transfer Capacitance	C_{rss}			33		

Notes

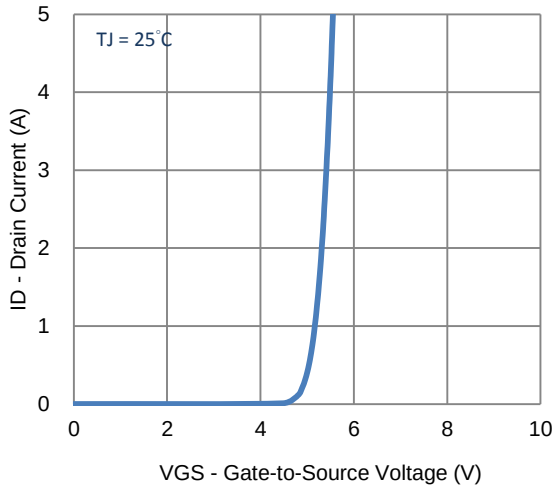
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

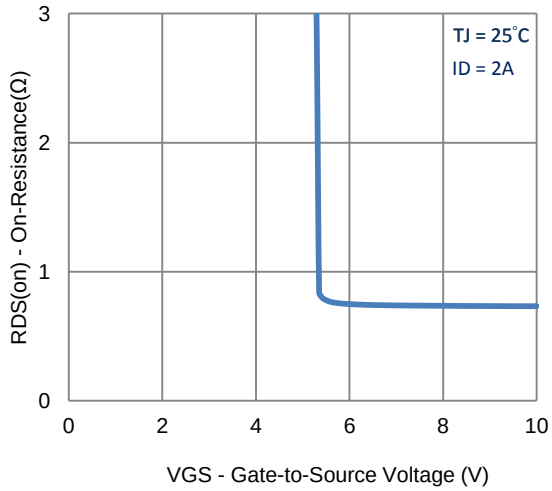
Typical Electrical Characteristics



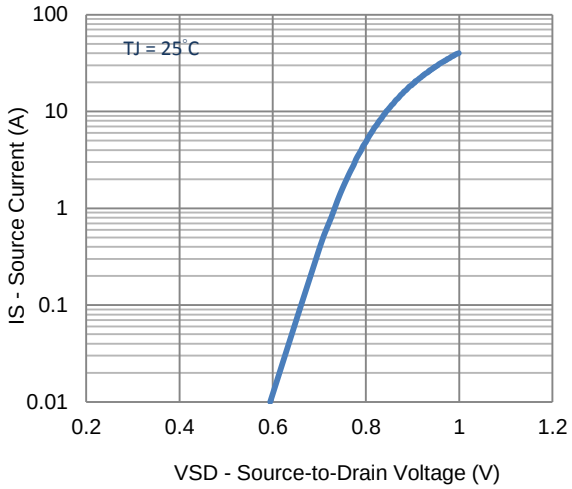
1. On-Resistance vs. Drain Current



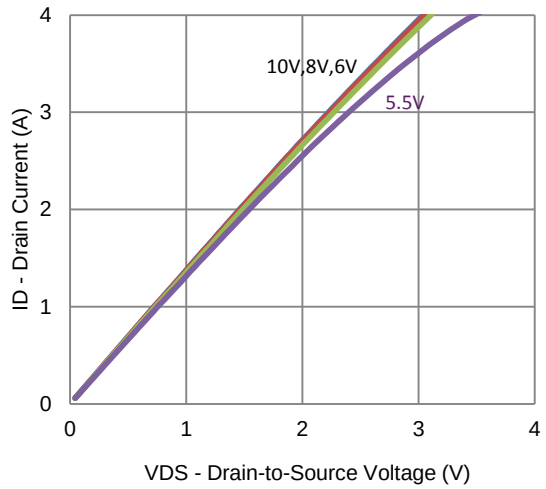
2. Transfer Characteristics



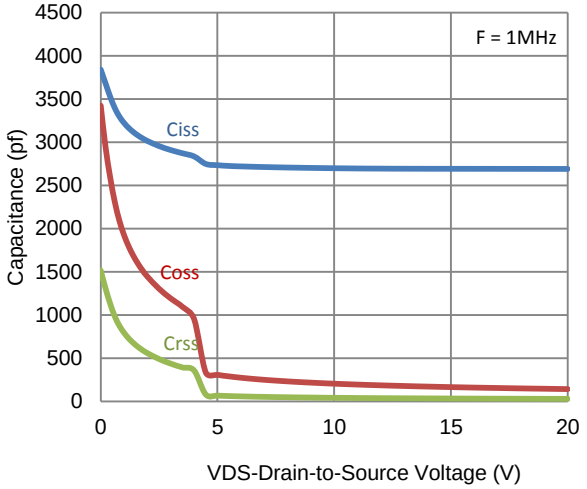
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

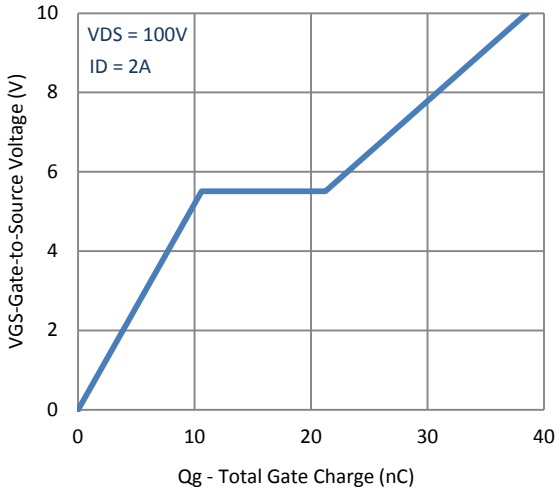


5. Output Characteristics

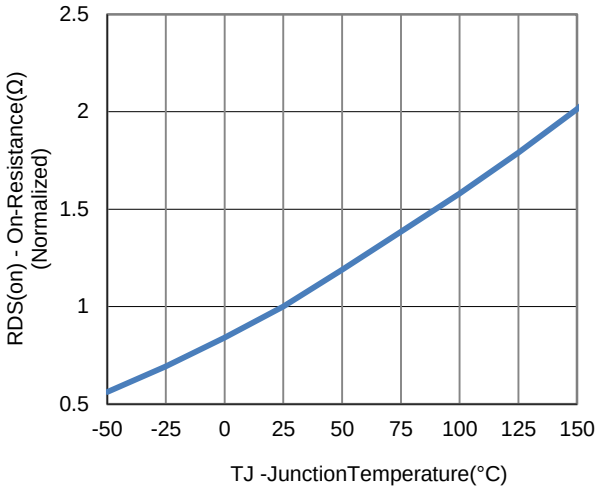


6. Capacitance

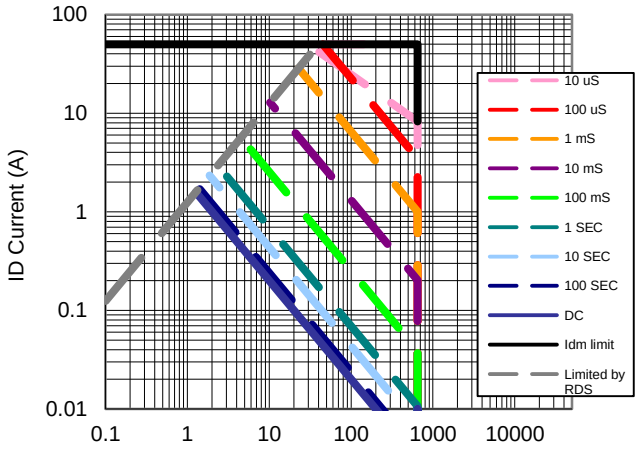
Typical Electrical Characteristics



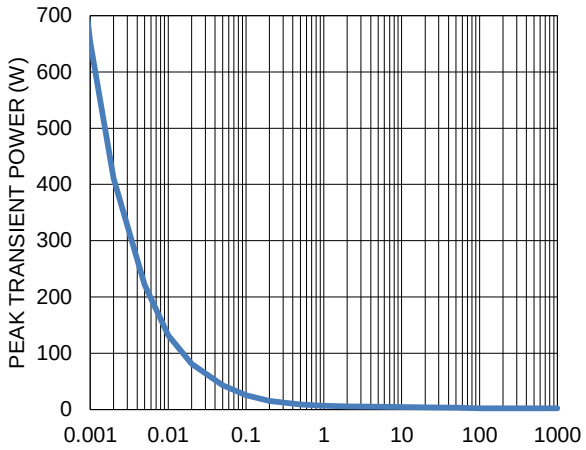
7. Gate Charge



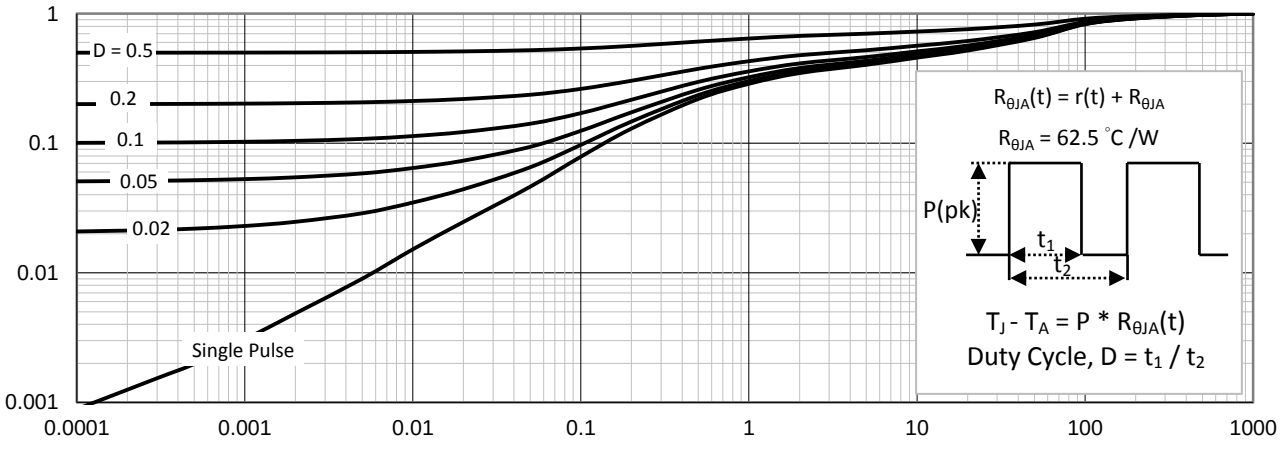
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area



10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information