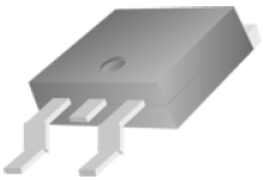
N-Channel 650-V (D-S) MOSFET

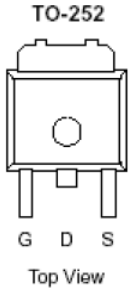
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

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	7000 @ V_{GS} = 10V	2.19
	7100 @ V_{GS} = 6.5V	2.17

Pb-free
RoHS COMPLIANT
HALOGEN FREE





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	2.19	A
Pulsed Drain Current [b]		I_{DM}	40	
Continuous Source Current (Diode Conduction) [a]		I_S	2	A
Power Dissipation [a]	T_C=25°C	P_D	50	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]	$R_{\theta JA}$	40	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	3	

Notes

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

b. Pulse width limited by maximum junction temperature

Electrical Characteristics

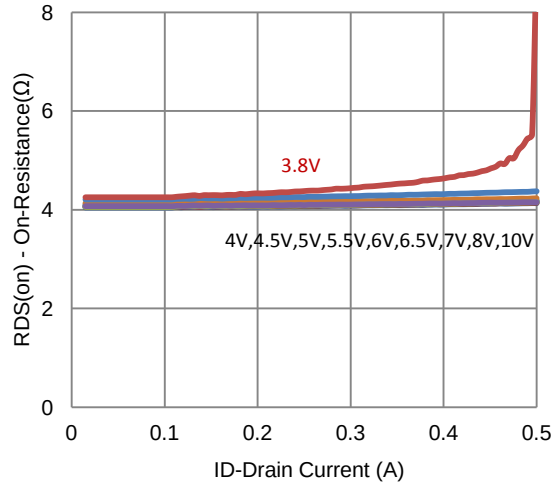
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 520 V, V_{GS} = 0 V			1	uA
		V_{DS} = 520 V, 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	3.285			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 A			7000	mΩ
		V_{GS} = 6.5 V, I_D = 0.4 A			7100	
Forward Transconductance [a]	g_{fs}	V_{DS} = 50 V, I_D = 0.5 A		2		S
Diode Forward Voltage [a]	V_{SD}	I_S = 1 A, V_{GS} = 0 V		0.8		V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = 100 V, V_{GS} = 6.5 V, I_D = 0.5 A		7		nC
Gate-Source Charge	Q_{gs}			2.1		
Gate-Drain Charge	Q_{gd}			2.2		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 100 V, R_L = 200 Ω, I_D = 0.5 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		5		ns
Rise Time	t_r			3		
Turn-Off Delay Time	$t_{d(off)}$			18		
Fall Time	t_f			9		
Input Capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 Mhz		322		pF
Output Capacitance	C_{oss}			20		
Reverse Transfer Capacitance	C_{rss}			4		

Notes

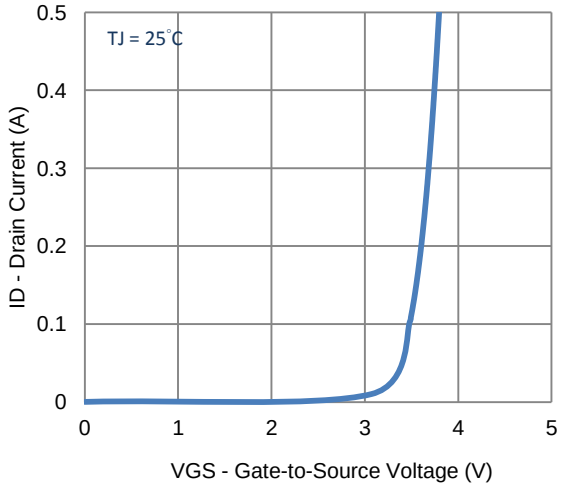
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

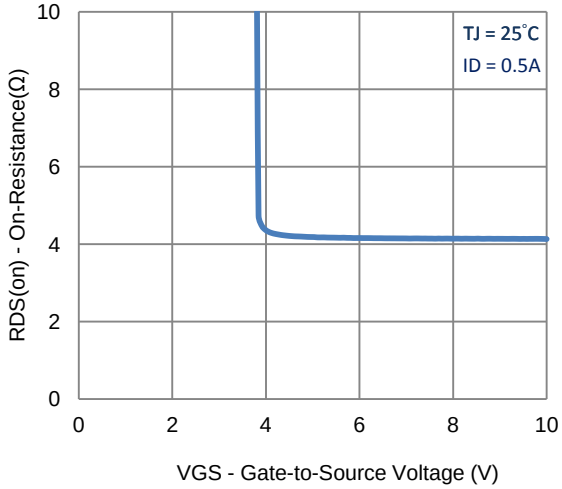
Typical Electrical Characteristics



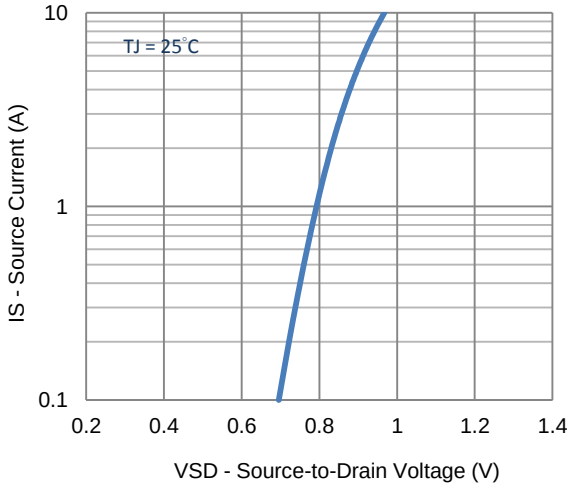
1. On-Resistance vs. Drain Current



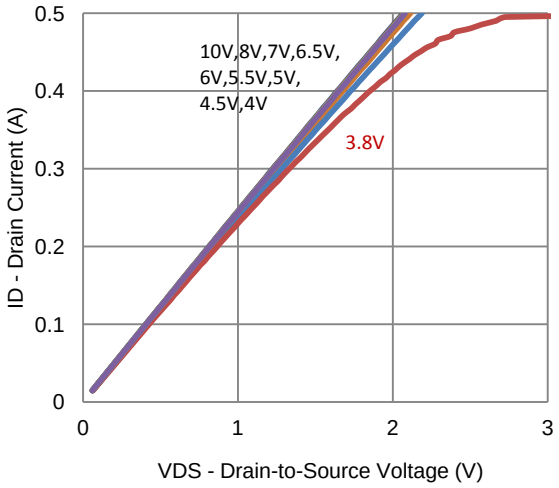
2. Transfer Characteristics



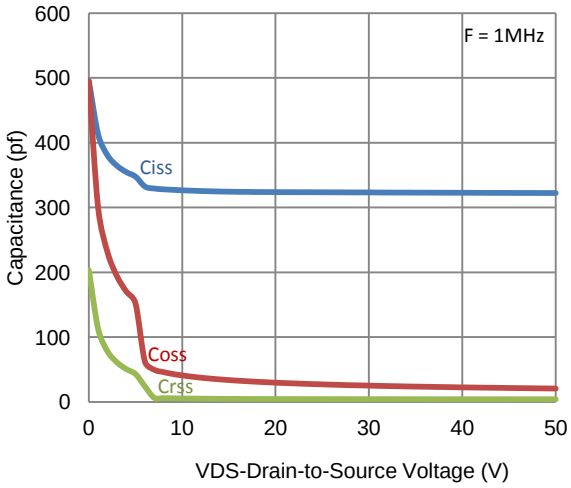
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

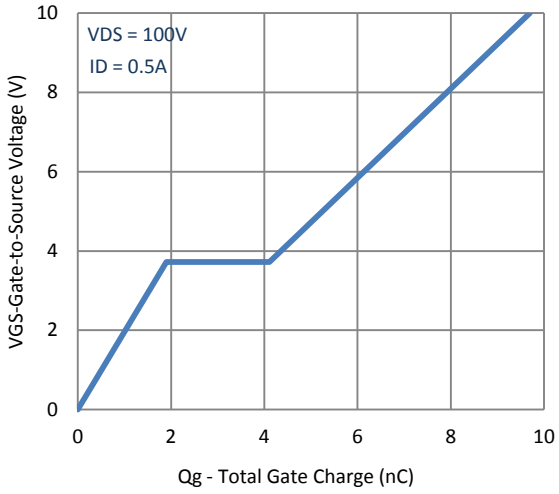


5. Output Characteristics

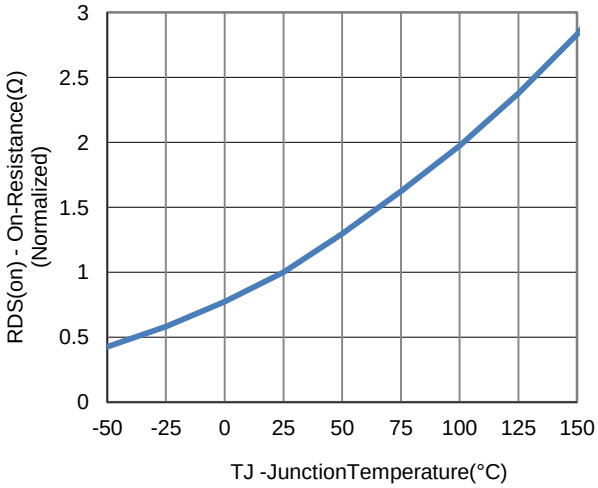


6. Capacitance

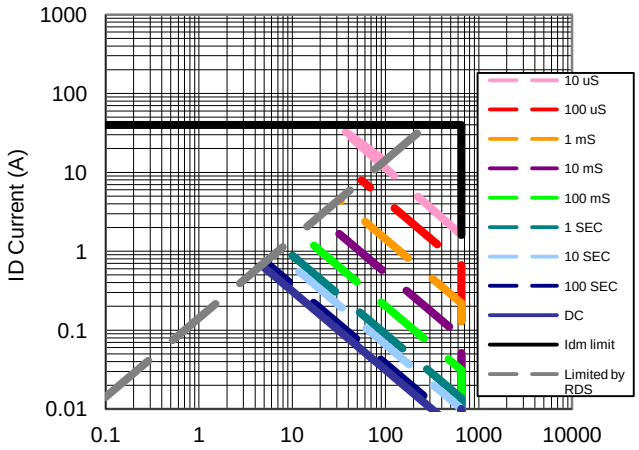
Typical Electrical Characteristics



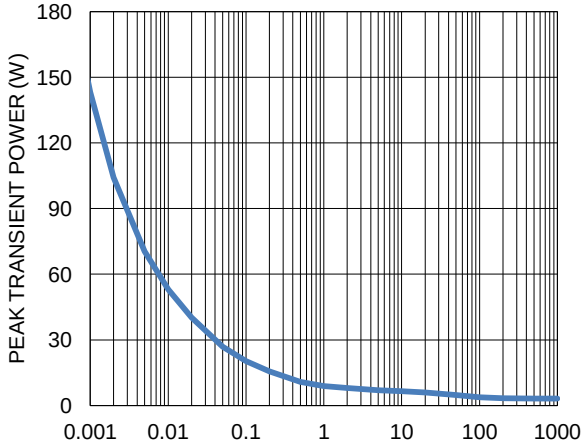
7. Gate Charge



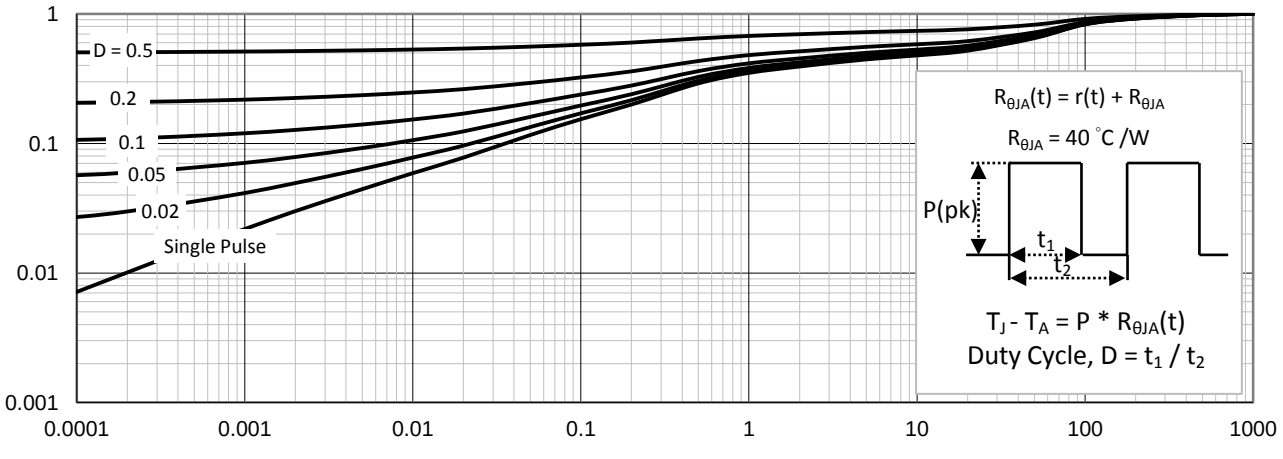
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

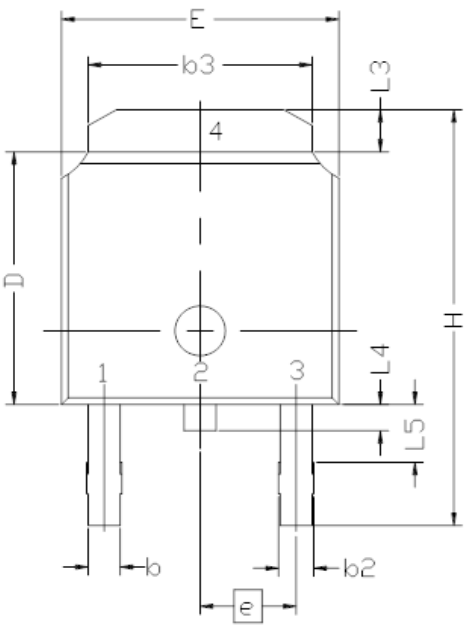


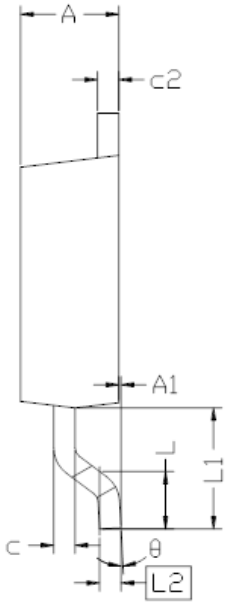
10. Single Pulse Maximum Power Dissipation

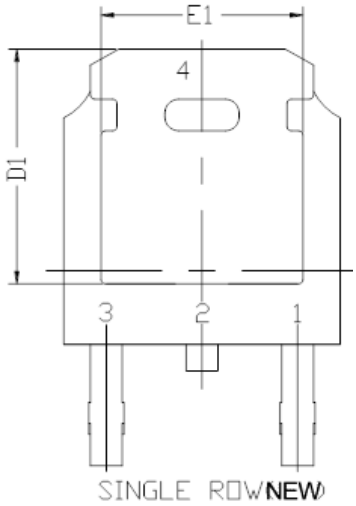


11. Normalized Thermal Transient Junction to Ambient

Package Information







SINGLE ROW NEW

SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	1.40	1.52	1.77
L1		2.743 REF	
L2		0.508 BSC	
L3	0.89	--	1.27
L4	0.64	--	1.01
L5	--	--	--
D	6.00	6.10	6.223
H	9.40	10.00	10.40
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e		2.286 BSC	
A	2.20	2.30	2.38
A1	0	--	0.127
c	0.45	0.50	0.60
c2	0.45	0.50	0.58
D1	5.30	--	--
E1	4.40	--	--
θ	0°	--	10°

Note:
1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.