# N-Channel 30-V (D-S) MOSFET

## **Key Features:**

- Low r<sub>DS(on)</sub> trench technology
- · Low thermal impedance
- · Fast switching speed

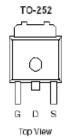
## **Typical Applications:**

- · White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	$r_{DS(on)}(m\Omega)$	I <sub>D</sub> (A)	
30	13 @ V <sub>GS</sub> = 10V	51	
30	20 @ V <sub>GS</sub> = 4.5V	41	







ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^{\circ}$ C UNLESS OTHERWISE NOTED)						
Parameter		Symbol	Limit	Units		
Drain-Source Voltage		$V_{DS}$	30	· V		
Gate-Source Voltage		$V_{GS}$	±20	V		
Continuous Drain Current <sup>a</sup>	T <sub>A</sub> =25°C	$I_D$	51	Α		
Pulsed Drain Current <sup>b</sup>		I <sub>DM</sub>	200	Α		
Continuous Source Current (Diode Conduction) <sup>a</sup>	I <sub>S</sub>	51	Α			
Power Dissipation <sup>a</sup>	T <sub>A</sub> =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 <sup>a</sup>	t <= 10 sec	$R_{\theta JA}$	40	°C/W		
Maximum Sunction-to-Ambient	Steady State	IΛθJA	3	C/VV		

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#### Notes

- a. Surface Mounted on 1" x 1" FR4 Board.
- b. Pulse width limited by maximum junction temperature

### **Electrical Characteristics**

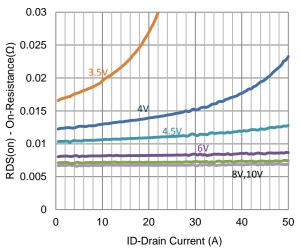
Parameter	Symbol	ol Test Conditions		Тур	Max	Unit	
Static							
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \text{ uA}$	1			V	
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			±100	nA	
Zero Gate Voltage Drain Current	l	$V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}$			1	uA	
Zero Gate Voltage Brain Gunerit	I <sub>DSS</sub>	$V_{DS} = 24 \text{ V}, V_{GS} = 0 \text{ V}, T_{J} = 55^{\circ}\text{C}$		25		ūζ	
On-State Drain Current	$I_{D(on)}$	$V_{DS} = 5 \text{ V}, V_{GS} = 10 \text{ V}$	100			Α	
Drain-Source On-Resistance	r	$V_{GS} = 10 \text{ V}, I_{D} = 20 \text{ A}$			13	mΩ	
Dialii-Source Off-Nesistance	r <sub>DS(on)</sub>	$V_{GS} = 4.5 \text{ V}, I_D = 16 \text{ A}$			20	11122	
Forward Transconductance	g <sub>fs</sub>	$V_{DS} = 15 \text{ V}, I_{D} = 20 \text{ A}$		20		S	
Diode Forward Voltage	$V_{SD}$	$I_{S} = 25 \text{ A}, V_{GS} = 0 \text{ V}$		0.89		V	
Dynamic							
Total Gate Charge	$Q_g$	$V_{DS} = 15 \text{ V}, V_{GS} = 4.5 \text{ V},$		15			
Gate-Source Charge	$Q_gs$	$I_{DS} = 13 \text{ V}, \text{ V}_{GS} = 4.3 \text{ V},$ $I_{D} = 20 \text{ A}$		5.0		nC	
Gate-Drain Charge	$Q_gd$	10 - 20 A		7.9			
Turn-On Delay Time	t <sub>d(on)</sub>	$V_{DS} = 15 \text{ V}, R_1 = 0.8 \Omega,$		9			
Rise Time	t <sub>r</sub>	$V_{DS} = 15 \text{ V}, \text{ K}_{L} - 0.8 \Omega,$ $I_{D} = 20 \text{ A},$		12		nc	
Turn-Off Delay Time	$t_{d(off)}$	$V_{GEN} = 10 \text{ V}, R_{GEN} = 6 \Omega$		38		ns	
Fall Time	t <sub>f</sub>	v GEN - 10 v, 1 (GEN - 0 12		19			
Input Capacitance	C <sub>iss</sub>			1299		_	
Output Capacitance	C <sub>oss</sub>	$V_{DS} = 15 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		249		pF	
Reverse Transfer Capacitance	$C_{rss}$			230			

#### Notes

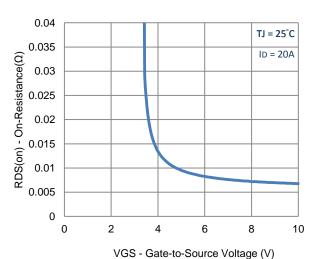
- a. Pulse test: PW <= 300us duty cycle <= 2%.
- b. Guaranteed by design, not subject to production testing.

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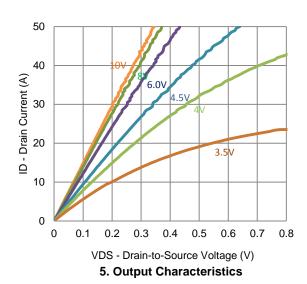
## **Typical Electrical Characteristics**



#### 1. On-Resistance vs. Drain Current



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



TJ = 25°C

40

40

End 20

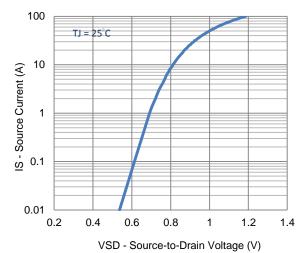
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0

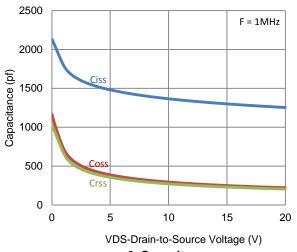
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VGS - Gate-to-Source Voltage (V)

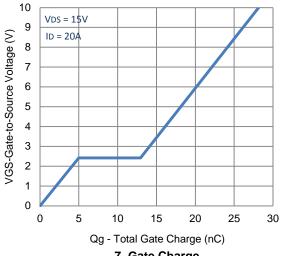
2. Transfer Characteristics



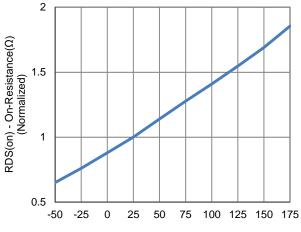
4. Drain-to-Source Forward Voltage



## **Typical Electrical Characteristics**

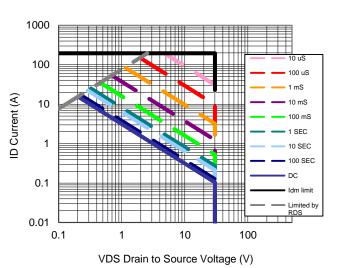


7. Gate Charge

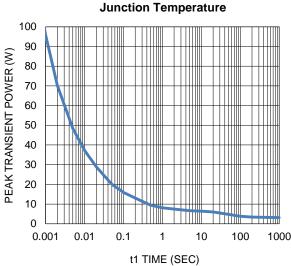


TJ -JunctionTemperature(°C)

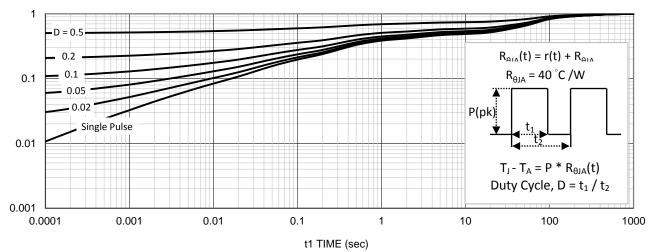
8. Normalized On-Resistance Vs



9. Safe Operating Area

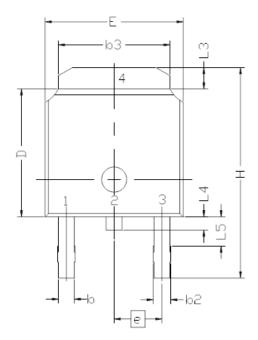


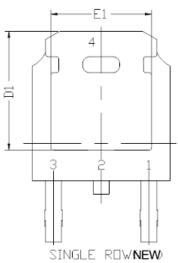
10. Single Pulse Maximum Power Dissipation

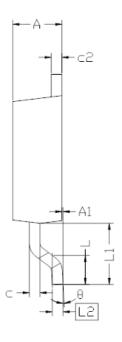


11. Normalized Thermal Transient Junction to Ambient

## **Package Information**







CVMDEI	DIMENS:		REQMTS		
SYMBOL	MIN	NDM	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		
Н	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		
е	2.	286 BS	C		
Α	2,20	2,30	2.38		
A1	0		0.127		
	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.

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