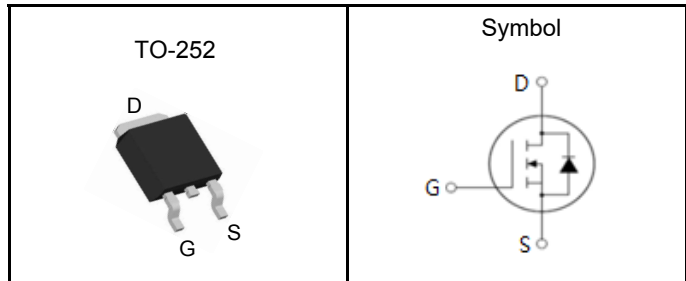


## 800V N Channel Super Junction MOSFET

### Features

- $BV_{DSS}=800\text{ V}$ ,  $I_D=8.0\text{ A}$
- $R_{DS(on)}:0.65\Omega$  (Max) @  $V_{GS}=10\text{V}$
- Very Low FOM ( $R_{DS(on)} \times Q_g$ )
- Extremely low switching loss
- Excellent stability and uniformity
- 100% Avalanche Tested



### Application

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- TV power & LED Lighting Power
- AC to DC Converters

### Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Unit
$V_{DSS}$	Drain-Source Voltage	800	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_C = 25^\circ\text{C}$ )	8.0 *	A
	Drain Current - Continuous ( $T_C = 100^\circ\text{C}$ )	5.1 *	A
$I_{DM}^{(1)}$	Drain Current - Pulsed	24 *	A
$E_{AS}^{(2)}$	Single Pulsed Avalanche Energy	200	mJ
$I_{AR}$	Avalanche Current	6.3	A
dv/dt	MOSFET dv/dt ruggedness, $V_{DS}=0\dots 400\text{V}$	50	V/ns
dv/dt	Reverse diode dv/dt, $V_{DS}=0\dots 400\text{V}$ , $I_{DS}\leq I_D$	15	V/ns
$P_D$	Power Dissipation ( $T_C = 25^\circ\text{C}$ )	140	W
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ\text{C}$

\* Drain current limited by maximum junction temperature

### Thermal Resistance Characteristics

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case, Max.	0.89	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient, Max.	80	$^\circ\text{C}/\text{W}$



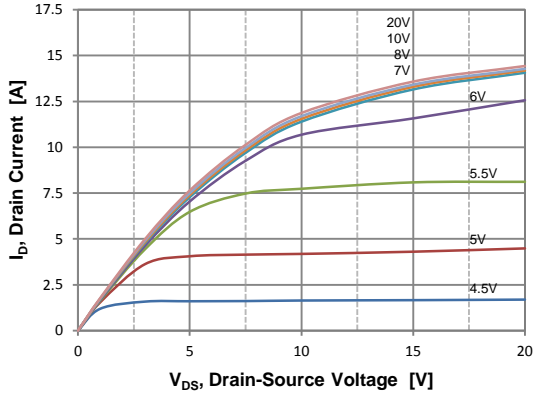
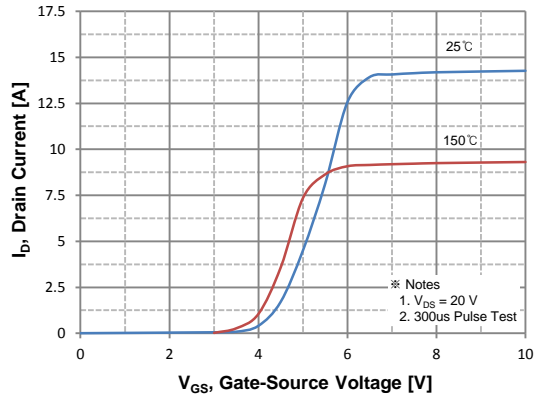
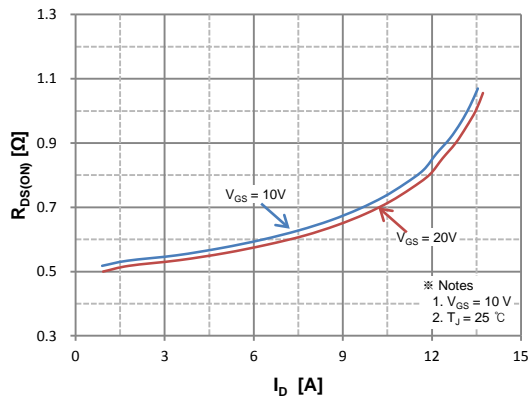
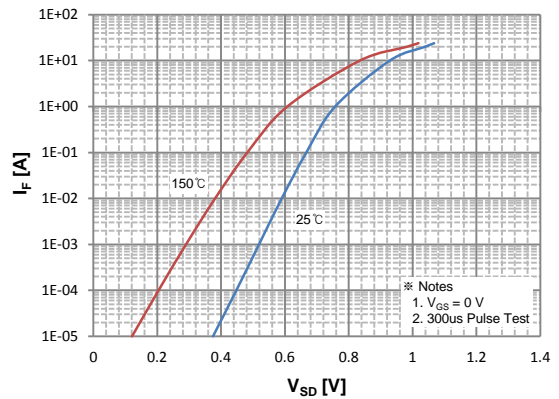
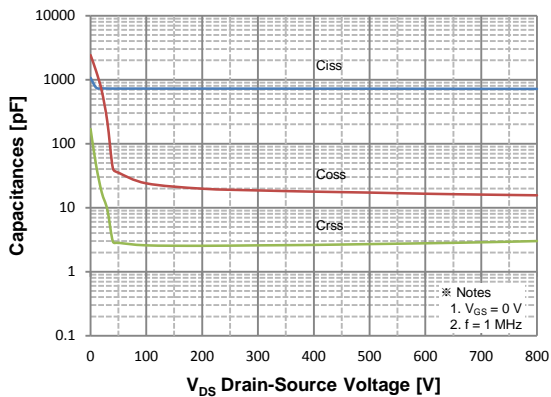
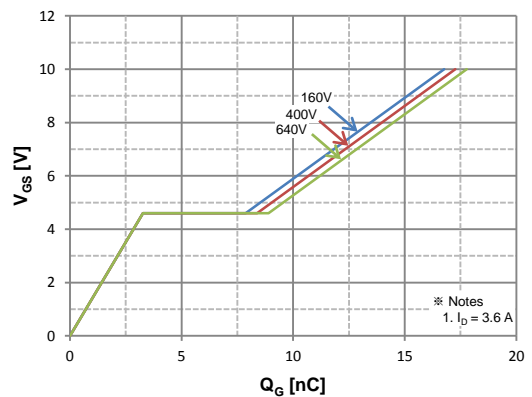
**800V N Channel Super Junction MOSFET**

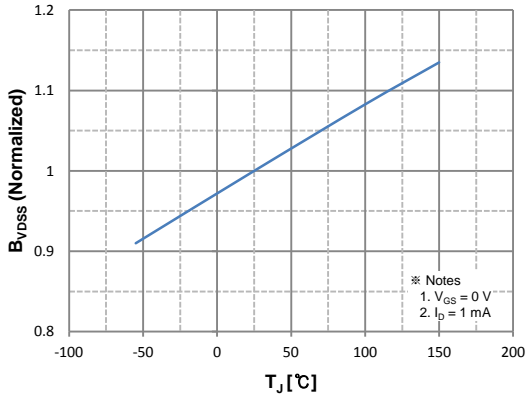
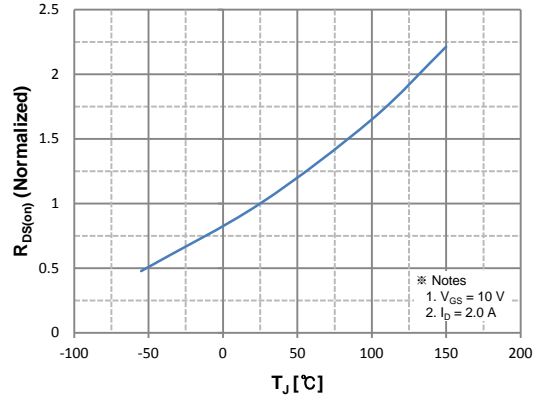
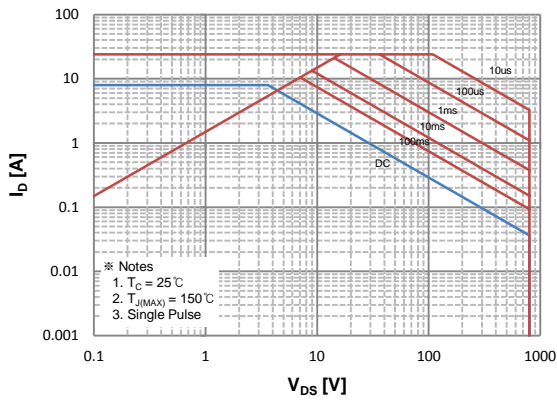
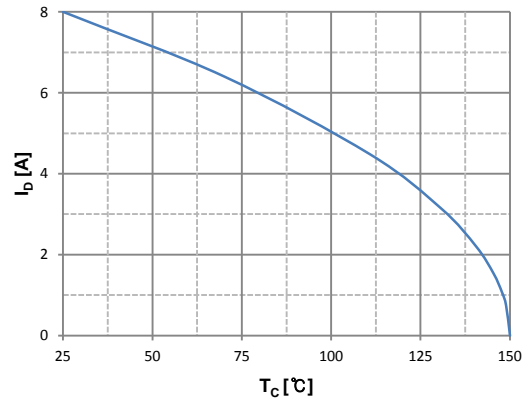
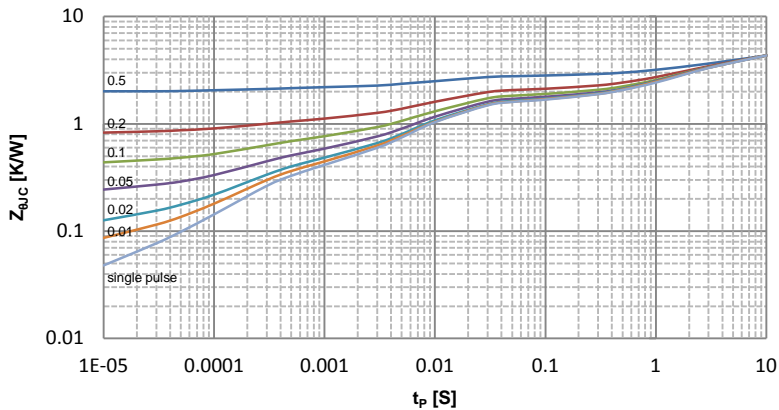
**Electrical Characteristics**  $T_J=25^\circ\text{C}$  unless otherwise specified

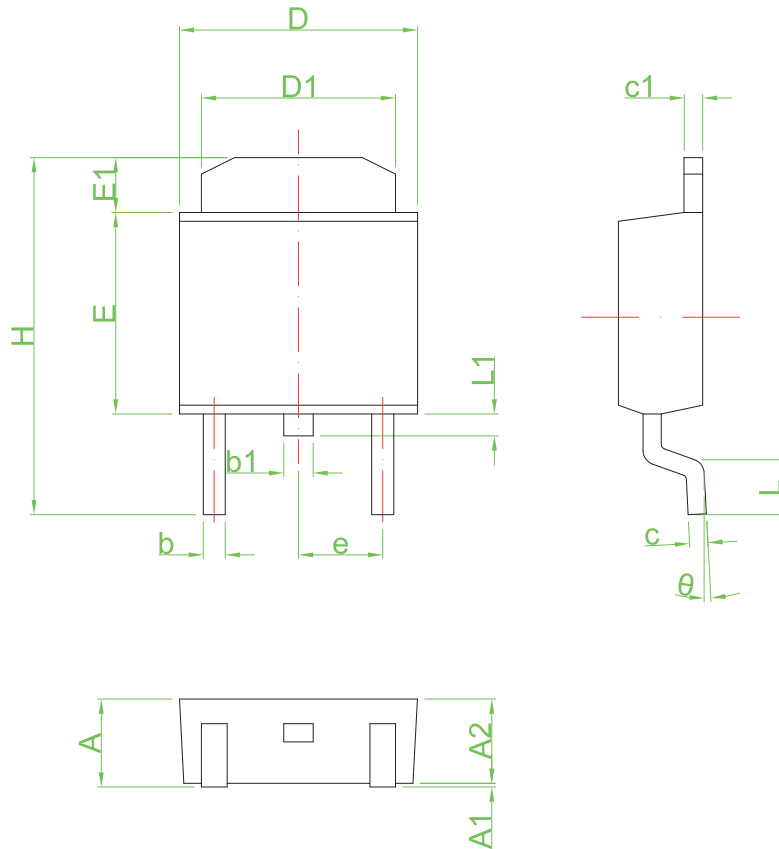
Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
<b>On Characteristics</b>						
$V_{GS}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	2.5	-	4.5	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = 10 \text{ V}, I_D = 2.0 \text{ A}$	-	0.56	0.65	$\Omega$
<b>Off Characteristics</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0 \text{ V}, I_D = 1\text{mA}$	800	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 800 \text{ V}, V_{GS} = 0$	-	-	1	$\mu\text{A}$
		$V_{DS} = 800 \text{ V}, T_C = 150^\circ\text{C}$	-	-	100	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage Current	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$	-	-	$\pm 1$	$\mu\text{A}$
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS} = 500 \text{ V}, V_{GS} = 0 \text{ V}, f = 1.0 \text{ MHz}$	-	725	-	pF
$C_{oss}$	Output Capacitance		-	18.2	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	2.8	-	pF
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-On Time	$V_{DS} = 400 \text{ V}, I_D = 3.6 \text{ A}, R_G = 25 \Omega$	-	23	-	ns
$t_r$	Turn-On Rise Time		-	20	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	91	-	ns
$t_f$	Turn-Off Fall Time		-	17	-	ns
$Q_g$	Total Gate Charge	$V_{DS} = 640 \text{ V}, I_D = 3.6 \text{ A}, V_{GS} = 10 \text{ V}$	-	18	-	nC
$Q_{gs}$	Gate-Source Charge		-	3.4	-	nC
$Q_{gd}$	Gate-Drain Charge		-	5.5	-	nC
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain-Source Diode Forward Current		-	-	8	A
$I_{SM}$	Maximum Pulsed Drain-Source Diode Forward Current		-	-	24	A
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_S = 3.6 \text{ A}$	-	-	1.3	V
$t_{rr}$	Reverse Recovery Time	$V_R = 400 \text{ V}, I_F = 3.6 \text{ A}, di_F/dt = 100 \text{ A}/\mu\text{s}$	-	292	-	ns
$Q_{rr}$	Reverse Recovery Charge		-	2.2	-	$\mu\text{C}$

**Notes :**

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2.  $I_{AS}=6.3\text{A}$   $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$
3. Pulse Test : Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
4. Essentially Independent of Operating Temperature

**800V N Channel Super Junction MOSFET**
**Typical Characteristics**

**Figure 1. On Region Characteristics**

**Figure 2. Transfer Characteristics**

**Figure 3. On Resistance Variation vs Drain Current and Gate Voltage**

**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**

**Figure 5. Capacitance Characteristics**

**Figure 6. Gate Charge Characteristics**

**800V N Channel Super Junction MOSFET**
**Typical Characteristics**

**Figure 7. Breakdown Voltage Variation vs. Temperature**

**Figure 8. On-Resistance Variation vs. Temperature**

**Figure 9. Maximum Safe Operating Area**

**Figure 10. Maximum Drain Current vs. Case Temperature**

**Figure 11. Transient Thermal Response Curve**

**800V N Channel Super Junction MOSFET**
**TO-252 Package Outline Dimensions**


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.25	2.65	0.089	0.104
A1	0.00	0.15	0.000	0.006
A2	2.20	2.40	0.087	0.094
b	0.50	0.70	0.020	0.028
b1	0.70	0.90	0.028	0.035
c	0.46	0.66	0.018	0.026
c1	0.46	0.66	0.018	0.026
D	6.30	6.70	0.248	0.264
D1	5.20	5.40	0.205	0.213
E	5.30	5.70	0.209	0.224
E1	1.40	1.60	0.055	0.063
H	9.40	9.90	0.370	0.390
e	2.30 TYP		0.09 TYP	
L	1.40	1.77	0.055	0.070
L1	0.50	0.70	0.020	0.028
theta	0°	8°	0°	8°