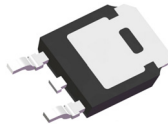


Product Summary

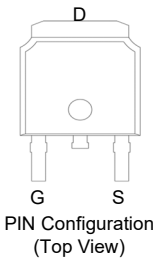
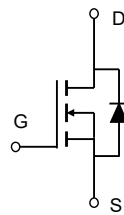
V_{DS}	$R_{DS(ON)_TYP}$	I_{D_MAX}
650 V	270 mΩ @ $V_{GS} = 10V$	13 A

TO252-3L


Top View



Bottom View


PIN Configuration
(Top View)


Schematic Diagram

Features

- Low On-Resistance
- Fast Switching Capability
- 100% ΔV_{DS} & UIS & Rg Tested


Applications

- LED Lighting
- Charger and Adapter
- PC and Telecom Power

Mechanical Data

- Green Molding Compound
- Moisture Sensitivity: Level 3 per J-STD-020
- UL Flammability Classification Rating 94V-0

Ordering Information

Orderable Part Number	Package Type	Device Marking	Form	Quantity (pcs)
SMJ65R290CNU	TO252-3L	65R290CN	13" Tape&Reel	2,500

Maximum Ratings (@ $T_C = 25^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Value	Unit
Drain - Source Voltage	V_{DS}	650	V
Gate - Source Voltage	V_{GS}	± 30	V
Continuous Drain Current ($V_{GS} = 10V$) ⁽¹⁾	I_D	$T_C = 25^\circ\text{C}$ 13	A
		$T_C = 100^\circ\text{C}$ 8.1	A
Pulsed Drain Current ⁽²⁾	I_{DM}	60	A
Single Pulse Avalanche Energy ⁽³⁾	E_{AS}	120	mJ
Single Pulse Avalanche Current ($L = 10.0\text{mH}$)	I_{AS}	9.1	A
Power Dissipation	P_D	$T_C = 25^\circ\text{C}$ 132	W
		$T_C = 100^\circ\text{C}$ 52.6	W
MOSFET dv/dt Ruggedness, $V_{DS}=0\dots 400V$	dv/dt	50	V/ns
Reverse Diodes dv/dt, $V_{DS}=0\dots 400V$, $I_{SD} \leq I_D$	dv/dt	50	V/ns
Junction & Storage Temperature Range	T_J, T_{STG}	-55 ~ +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance, Junction-to-Ambient ⁽⁴⁾	$R_{\theta JA}$	50	65	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case ⁽⁵⁾	$R_{\theta JC}$	0.68	0.95	$^\circ\text{C/W}$

Electrical Characteristics (@ $T_J = 25^\circ\text{C}$, unless otherwise specified.)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics ⁽⁶⁾						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	650	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 600V, V _{GS} = 0V	-	-	1.0	μA
		T _J = 125°C	-	-	100	μA
Gate-Source Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	±100	nA
On Characteristics ⁽⁶⁾						
Gate Threshold Voltage	V _{GS(th)}	V _{GS} = V _{DS} , I _D = 250μA	2.8	3.3	3.8	V
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 10A	-	270	290	mΩ
Diodes Forward Voltage	V _{SD}	I _S = 10A, V _{GS} = 0V	-	0.86	1.1	V
Dynamic Characteristics ⁽⁷⁾						
Input Capacitance	C _{iss}	V _{DS} = 100V, V _{GS} = 0V, f = 1MHz	-	750	-	pF
Output Capacitance	C _{oss}		-	40	-	pF
Reverse Transfer Capacitance	C _{rss}		-	1.4	-	pF
Gate Resistance	R _g	V _{GS} = 0V, V _{DS} = 0V, f = 1MHz	-	6.5	-	Ω
Switching Characteristics ⁽⁷⁾						
Turn-On DelayTime	t _{d(on)}	V _{GS} = 10V, V _{DS} = 400V I _D = 10A, R _{GEN} = 3.0Ω	-	14	-	ns
Rise Time	t _r		-	24	-	ns
Turn-Off DelayTime	t _{d(off)}		-	97	-	ns
Fall Time	t _f		-	22	-	ns
Gate Charge Characteristics ⁽⁷⁾						
Total Gate Charge (V _{GS} = 10V)	Q _g	V _{DS} = 400V, I _D = 10A V _{GS} = 10V	-	24	-	nC
Total Gate Charge (V _{GS} = 8.0V)	Q _g		-	18	-	nC
Gate-Source Charge	Q _{gs}		-	5.0	-	nC
Gate-Drain Charge	Q _{gd}		-	10.0	-	nC
Gate Plateau Voltage	V _{plateau}		-	5.7	-	V
Drain-Source Diode Characteristics ⁽⁷⁾						
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10A, dI/dt = 100A/μs, T _J = 25°C	-	250	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	2.9	-	μC
Diode Forward Current	I _S	T _C = 25°C	-	-	13	A

Notes:

1. This current is chip limited, which is calculated based on R_{thjc} .
2. This current is calculated on single pulse with 10 μs Pulse & Duty Cycle = 1%.
3. Defined by design, not subject to production test, E_{AS} condition: $T_J = 25^\circ\text{C}$, $V_{DD} = 400V$, $V_{GS} = 10V$, $L = 50mH$.
4. Device mounted on FR-4 substrate PC board with 2oz copper in 1inch square cooling area.
5. Thermal resistance from junction to the exposed pad).
6. Short duration pulse test used to minimize self-heating effect.
7. Defined by design, not subject to production.
8. $C_{O(er)}$ is a fixed capacitance that gives the same stored energy as C_{OSS} while V_{DS} is rising from 0 to 480V.
9. $C_{O(tr)}$ is a fixed capacitance that gives the same charging time as C_{OSS} while V_{DS} is rising from 0 to 480V.

Typical Electrical and Thermal Characteristics

Fig 1. Output Characteristics ($T_J=25^\circ\text{C}$)

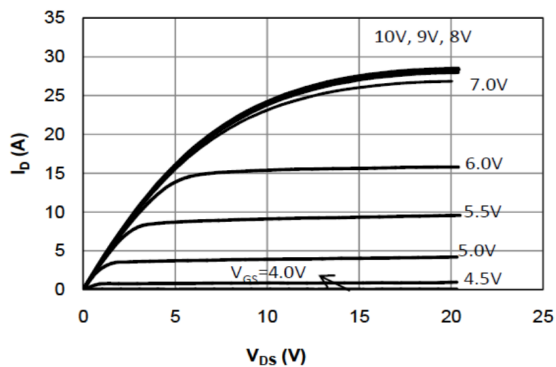


Fig 2. Output Characteristics ($T_J=150^\circ\text{C}$)

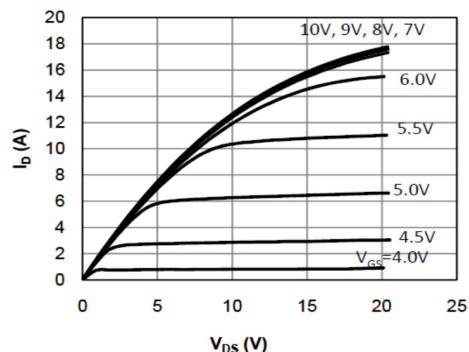


Fig 3: Transfer Characteristics

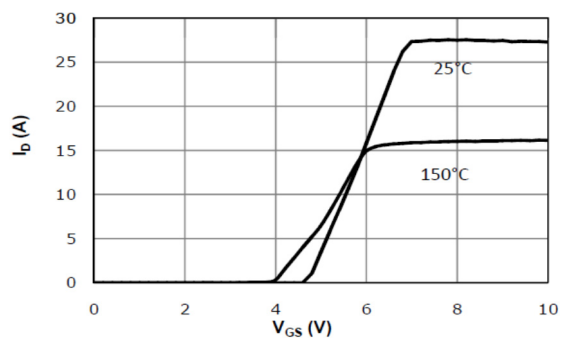


Fig 4: V_{TH} vs. T_J Temperature Characteristics

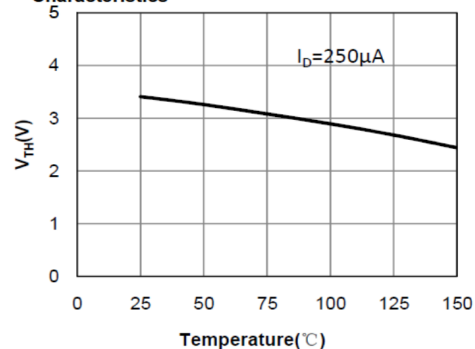


Fig 5: $R_{DS(on)}$ vs. I_{DS} Characteristics ($T_J=25^\circ\text{C}$)

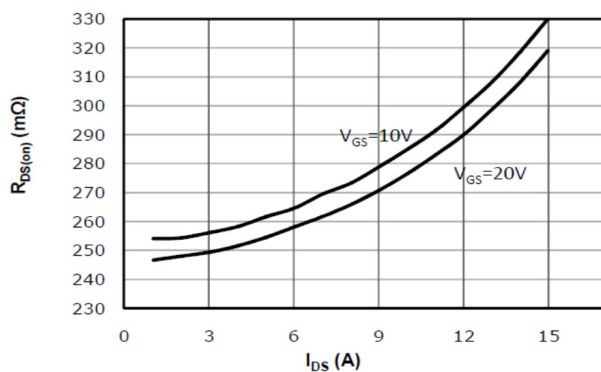
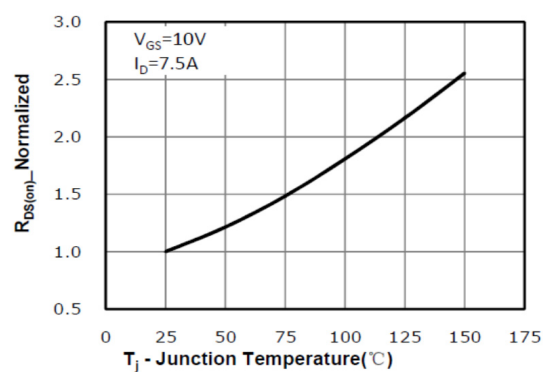
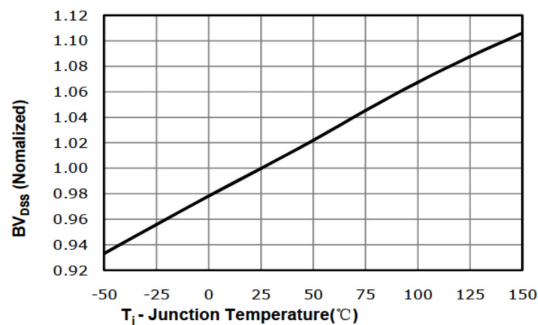
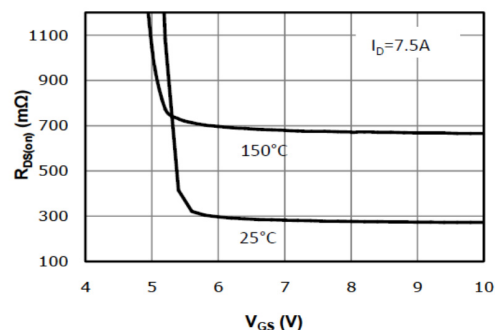
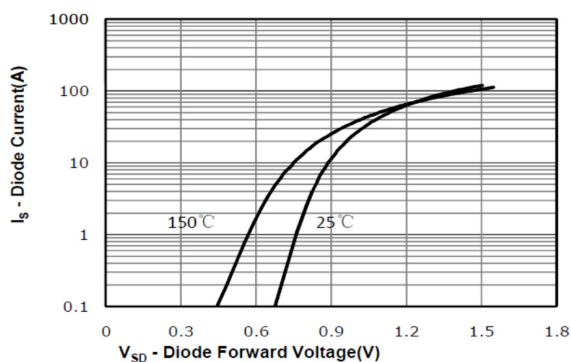
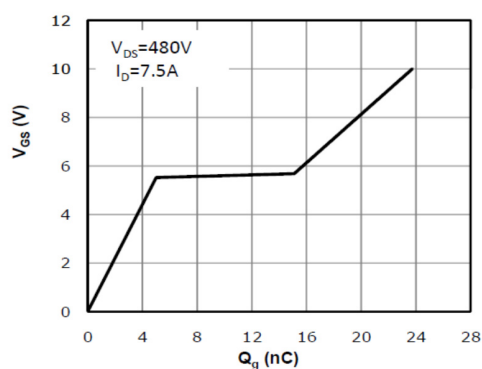
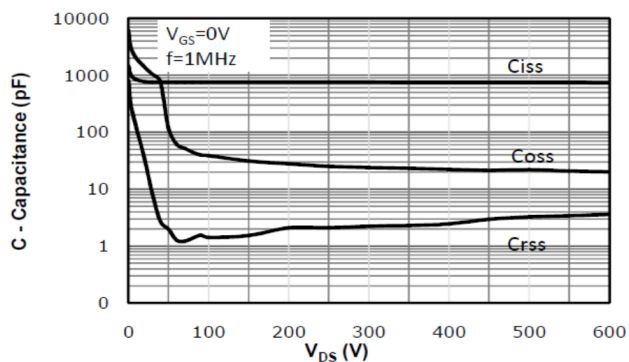
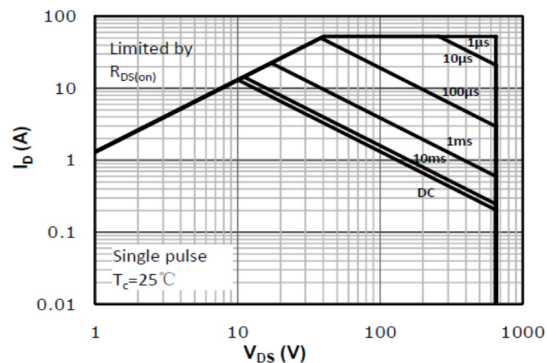


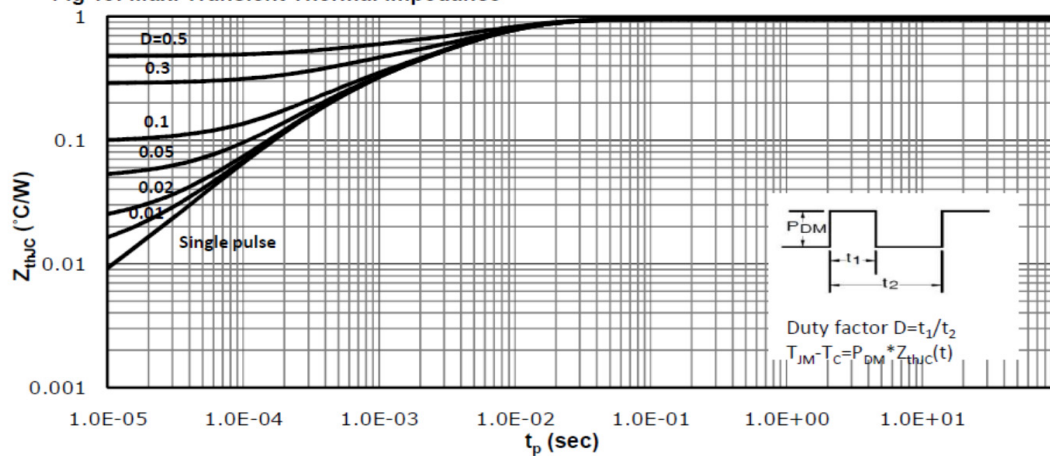
Fig 6: $R_{DS(on)}$ vs. Temperature

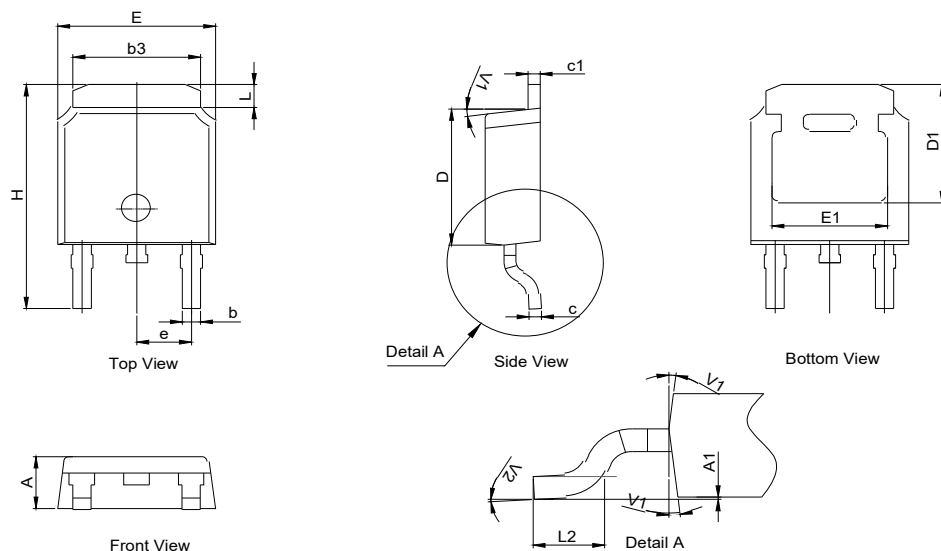


Typical Electrical and Thermal Characteristics
Fig 7: BV_{DS} vs. Temperature

Fig 8: $R_{DS(on)}$ vs. Gate Voltage

Fig 9: Body-diode Forward Characteristics

Fig 10: Gate Charge Characteristics

Fig 11: Capacitance Characteristics

Fig 12: Safe Operating Area


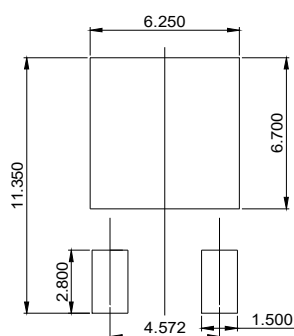
Typical Electrical and Thermal Characteristics

Fig 13: Max. Transient Thermal Impedance



TO252-3L Package Outline
Package Outline


DIM.	MILLIMETER		
	MIN.	NOM.	MAX.
A	2.20	2.30	2.40
A1	0	-	0.13
b	0.62	0.76	0.90
c	0.40	0.50	0.61
c1	0.46	0.50	0.58
D	5.97	6.10	6.23
D1	5.05	--	--
E	6.35	6.60	6.73
E1	4.32	--	--
b3	5.21	5.38	5.55
e	2.29 BSC		
H	9.40	10.00	10.40
L	0.89	--	1.27
L2	1.40	--	1.78
V1	7° REF		
V2	0°	-	6°

Recommend Soldering Footprint


DIMENSIONS: MILLIMETERS